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A GUIDE

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TO THE

NEW PHARMACOPŒIA

(1885).

COMPRISING

AN EPITOME OF THE CHANGES,

AND

AN ACCOUNT OF THE NEW PREPARATIONS, THEIR
CHARACTERS, USES, DOSES, AND MODES
OF ADMINISTRATION;

TOGETHER WITH A THERAPEUTICAL COMMENTARY.

BY

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PREFACE.

THE publication of a new Pharmacopœia is an event of considerable importance to those engaged in prescribing or dispensing. Their daily and hourly occupations are necessarily affected by every alteration in the official standard. The announcement that the changes made may be counted by hundreds is, therefore, likely to evoke mixed feelings. Busy men, though fully appreciating the advantages of revision, and cheerfully submitting to the temporary inconvenience it creates, may well feel conscious that it adds to their present cares a certain uneasiness lest a momentary forgetfulness should be fraught with mischief or danger. Elder students may sigh over the hours they have spent on the older Pharmacopœia and the annoyance of having to get up the new. Freshmen may congratulate themselves that there is no likelihood of another edition until they have for some time been engaged in the responsibilities of practice.

The numerous changes now made in the B. P. are scattered throughout its pages, and of course no indication could be given of their relative importance. The careful reader meets with them at every turn. Botanical and

chemical descriptions have been carefully revised, names have been changed, a few things omitted and many added. It is true that many of the alterations are of minor importance and attended with no risk; but it is desirable not to delay becoming familiar with them, especially such as involve differences of quality or strength.

The additions, too, are rather numerous—no less than 114. No doubt many of these new official remedies have already been extensively used; but the very fact of their admission to the Pharmacopœia gives them a further claim to attention. Some are fairly well known to practitioners as among their most useful remedies, and their admission to the new B. P. was generally foreseen. About others, however, surprise at their promotion is likely to be felt.

In the following pages a guide is offered to the many changes made, and it is hoped that nothing of importance has been overlooked. The author has not hesitated to indicate his own opinion of the value of the remedies under notice, for he had no idea of confining himself to the construction of catalogues and tables, or the repetition of official statements. While, therefore, giving the Pharmacopœial processes, he has not hesitated to abbreviate the descriptions wherever he thought proper, or to append such remarks as he is willing to submit to his professional brethren.

Many of the minor changes are merely epitomised, but of all the newly admitted articles a full account is given—fuller in many cases than may be found of even official remedies in the ordinary text books of materia medica. The busy practitioner may not regret to find in a small compass information

which he may have to some extent acquired from his own experience, or from the reports of periodical literature.

I have, therefore, ventured in places on a rather lengthy therapeutical commentary, and have not hesitated occasionally to drop some criticism. The question of dosage, for instance, has been discussed in reference to several remedies, instead of merely repeating the necessarily bald statement of the official dose—which, however, is always quoted.

At the same time, the details necessary for students have not been forgotten. Anyone with ordinary humanity, to say nothing of the “milk of human kindness,” will excuse a word on behalf of the over-burdened student, who is too often driven by a bad system to the cramming process which he nevertheless despises. Of late years students have learned, by bitter experience, that examiners have not considered themselves confined to the official *materia medica*, and murmurs, deep if not loud, are accordingly heard in the colleges. That the B. P. was rather out of date was an excuse which the new issue will destroy. But more than this is required. There are plenty of things in the B. P. with which the student has no concern, and yet he is constantly required to read up for the occasion details which he will at once forget. The cry for restricting the area of examinations is unheeded, and occasionally examiners pelt students with materials which they employ for no other purpose. Such highly developed boys have lost all respect for the opinion of frogs.

In conclusion, the author hopes his unpretending Guide

may prove useful to both practitioners and students. It is not only a supplement to the new B. P., but may be made to convert the old into the new. So, it is a natural supplement to the ordinary manuals of materia medica, a favourite copy of any of which may be made to retain its usefulness in the library by merely marking, at the proper places in the margin, references to the pages of this Guide where the new official remedies are described. Apart from this, it will enable the reader to rapidly master the numerous changes that have this month become compulsory.

PROSSER JAMES.

3, DEAN STREET, PARK LANE, W.

September, 1885.

POSTSCRIPT.—So early a call for a second edition must render another preface unnecessary. Suffice it to say, that the pages have been carefully revised, a few misprints corrected, and considerable additions made—including an index. The book is also printed on better paper, and bound in a stronger cover.

P. J.

9th Nov., 1885.

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GUIDE

TO THE

NEW PHARMACOPŒIA, 1885.

ALTERATIONS IN STRENGTH OF POTENT PREPARATIONS.

THE practitioner who has been for years accustomed to his Pharmacopœia naturally regards a new issue with some degree of curiosity, and even anxiety. His first question will probably refer to changes in the strength of the more potent preparations, as error in regard to them may be fraught with danger, or lead to unsuccessful treatment. In this respect the changes are quite numerous enough and important enough to demand watchfulness. In some cases the object has been to attain more uniformity, in others to approach or conform to other Pharmacopœias, and in several to initiate the plan of reckoning by percentages or by relative parts—all desirable objects, but not to be attained without temporary risk or inconvenience. The question arises whether steps in such a direction should be made from time to time, or whether it would not be better to make a more radical change or else none.

PREPARATIONS INCREASED IN STRENGTH.

Alkaloidal Solutions.—Three solutions of morphia, or, as it is henceforth to be called, morphine, viz. :—

Injectio Morphinæ Hypodermica.—This is now to contain 1 grain in 10 minims (instead of 1 in 12)—a very important

increase, which must never be forgotten in ordering or making subcutaneous injections.

Liquor Morphinae Acetatis—now 1 per cent.

Liquor Morphinae Hydrochloratis—now 1 per cent.

Both these solutions were formerly made with 4 grs. of the salt to 1 fluid ounce, but 8 minims of acid were added. This gave as a result 1 in 122, but the solution was often made by adding the water up to 1 oz., and so would be 1 in 120 minims. Reckoning we suppose by weights, it is now said in the B. P. that the former official solutions were 1 in 109, but the present are calculated to be 1 in 100, and may be made by dissolving 1 part in 99 fluid parts.

Three arsenical solutions are also now made to be 1 per cent. :—

(a) Liquor Arsenicalis.

(b) Liquor Arsenici Hydrochloricus.

(c) Liquor Sodii (no longer sodæ) Arseniatis.

The increase corresponds exactly with that made in the morphine solutions (1 in 100, instead of 109), as well as the two following :—

Liquor Atropinae (no longer atropiæ) Sulphatis—in future 1 per cent.

Liquor Strychninae (formerly strychniæ) Hydrochloratis—also in future 1 per cent.

Inorganic Preparations.—In this case the change is of much less consequence :—

Liquor Potassii Permanganatis. This is now 1 in 100.

Liquor Iodi. In this, too, there is a percentage solution, but the dose being larger it is made with 5 of iodine and $7\frac{1}{2}$ of iodide of potassium in 100.

Oleum Phosphoratum is considerably altered and increased in strength, and an attempt has been made to show that the pill can be dispensed with safety. (*See Phosphorus*, p. 39.)

NOMENCLATURE.

The next point probably to engage the attention of busy practitioners will be changes in the official names of medicines. There are more than 100 changes of names which will affect the writing of prescriptions. Only a few of these, however, are due to material alterations in the composition of preparations, such as Pulv. Elaterini (instead of

Elaterii), Comp., Ung. Glycerini Plumbi Subacetatis for Ung. Plumbi Subac., and the alterations consequent on red bark being now used in all galenicals.

Many changes are due to the recognition of modern chemical nomenclature, *e.g.*, salts are now named after their metals, and we have *Potassii*, *Sodii*, *Lithii*, *Magnesii*, *Calcii*, and even *Ammonii*, *Carbonas*, *Sulphas*, &c. But the terms *Potassa*, *Soda*, *Ammonia*, and *Magnesia* (with their genitives in *æ*) do not disappear as the Latin equivalents of Potash, Soda, &c., while *Calx* cannot be denied to be good Latin for Lime. Such expressions, therefore, as *Calx Chlorinata*, *Potassa Caustica* and *Sulphurata*, *Soda Caustica* and *Tartarata*, remain, and the consequent ones, *Liquor Calcis*, *Liq. Sodæ*, *Liq. Potassæ*, *Liq. Ammoniæ*. Accordingly, the saccharated, chlorinated, and effervescent solutions, of course, retain their names, and even *Liq. Lithiæ Efferv.* is retained for Lithia Water, though it is made with Carbonate of Lithium, which, like Citrate of Lithium, is to be named after the metal. But no attempt is made to follow chemical nomenclature throughout, *e.g.*, the word acid is still used in a conventional way, and includes anhydrides and phenol.

Another series of changes is due to the abandonment of the termination *ia* for alkaloids. Doctors advancing in years will now go back to the usage of their younger days, and after learning to say quinia, atropia, strychnia, &c, will return to the endings in *ine*, Latin *ina*. Quinina, strychnina, atropina, morphina, veratrina, and so on, are once more in fashion. This will, of course, affect the distinction which some have attempted to establish between true alkaloids and glucosides or other substances ending in *in*.

Other changes are due to more accurate botanical terms being applied; *e.g.*, *radix* is in several instances displaced by *rhizoma*. The adjective is dropped after *canella bark*, and we are to say *canellæ cortex* simply.

A number of alterations in the botanical descriptions are noticeable, but do not affect the nomenclature.

Some *minor* changes are made, for instance, in spelling and position of words. *Ecbalii Fructus* now doubles its *l*, no doubt in deference to its reputed Greek parentage. To redress the balance the foetid gum, perhaps in accordance with its supposed Persian derivation, is no longer to sport its double *s*, but to be written *Asafoetida*. *Albumen Ovi* becomes *Ovi Albumen*, and is thereby restored to the embrace of the

vitellus on a single page of the B. P., after the long separation pronounced in 1867. Some of the changes in names will again be referred to in considering other alterations concerning the substances they affect.

CHANGES IN GALENICAL GROUPS.

It is convenient to enumerate these, but all important particulars about them will be found in subsequent sections.

Acids.—Ten admissions, and two important changes, render it necessary to give these at length in a subsequent section.

Confections.—Conf. Sulphuris has now added $\frac{1}{4}$ part of powdered tragacanth=18 grains to the quantities used in the last B. P.

Decoctions.—One—Dec. Ulmi, is dismissed, and with it goes the bark of which it was the only preparation.

Dec. Aloes Comp. is somewhat altered in strength, as $\frac{1}{2}$ oz. of aloes is ordered for a quantity of 50 fl. oz.—as against the 120 grs. to 30 fl. oz. of the last Pharmacopœia, which was easy to remember as=4 grs. to 1 oz. The first B. P. (1864) raised the strength of the P. L. decoction from 3·3 grs. to 5·6. This being unsatisfactory, it was reduced in 1867 to 4 grs. Now we have another increase, as instead of 200 gr. to make the new quantity, we are told to take $\frac{1}{2}$ oz., and the official oz. is the avoirdupois, containing 437·5 grains. An increase of between 18 and 19 grains in 50 oz. may be of no consequence in the eyes of our compilers, but to many patients the difference will be appreciable, and there seems no object to be gained by this continual tinkering of formulæ. Of Myrrh, Saffron, and Carbonate of Potassium $\frac{1}{4}$ oz. of each is now to be used for the 50 fl. oz., with 2 oz. of Ext. Glyc. and 15 of Tinct. Card. Comp.

Extracts.—Ten additions are made—of these five are liquid extracts (those of Cascara, Cimicifuga, Coca, Rhamnus Frangula, Taraxacum); two are alcoholic extracts (of Belladonna and Gelsemium), and there are three without affix (of Jaborandi, Cascara, and Rhamnus). The colouring matter of green extracts is to be passed through a hair sieve.

Ext. Sarsæ Liq. is now made with 40 oz. of the root, in No. 40 powder, which is exhausted with proof spirit, expressed and brought to measure 40 fluid oz., 5 oz. of sugar being previously added. The synonym Liq. Sarsæ is recognised.

This will be a more expensive preparation. Let us hope it will satisfy those who believe in the virtues of Sarsa.

In making Ext. Calumbæ, proof spirit is now to be used.

Ether is no longer used in making Ext. Ergot. Liq., and cold water instead of warm is employed.

In Ext. Glycyrrhizæ Liq. the spirit is increased from $\frac{1}{8}$ to $\frac{1}{6}$ of the bulk. As it is so apt to ferment, perhaps an increase to $\frac{1}{4}$ would have been better.

In Ext. Pereiræ the root (in No. 40 powder) is exhausted as before by boiling water, but omitting spirit. The liquid extract is to be made by dissolving 4 parts of this extract in 16 of diluted spirit (1 of sp. to 3 of water).

In Ext. Belæ. Liq. the spirit is increased from 2 to 3 fl. oz.

Glycerines.—Three new ones—of Alum, Subacetate of Lead, and Tragacanth.

Enema.—Tobacco enema is at last rejected; but “the weed” itself is still official, as Tabaci Folia.

Infusions.—One new admission, viz., inf. jaborandi, and one exclusion, viz., inf. dulcamaræ; the plant itself, in this last case, also making its exit. The time of infusing is reduced usually from 2 hours to 1 hour, and from 1 to $\frac{1}{2}$ hour.

Hypodermic Injections.—Two new ones are given—of Apomorphine and Ergotin.

Liniments.—Glycerine $\frac{1}{4}$ oz. now replaces the $\frac{1}{4}$ oz. camphor in Lin. Iod. In Lin. Potas. Iod. \bar{c} Sapone 2 oz. of curd soap is to replace the $1\frac{1}{2}$ oz. of hard soap formerly ordered. The soap is dissolved in the glycerine over a water-bath, poured into a mortar, in which the salt has been powdered, and triturated until cold, and after an hour oil of lemon added, and the whole rubbed into a thick cream-like product.

In Lin. Aconiti and Lin. Bellad. 30 fl. oz. of spirit are used instead of 20 oz., but the product is practically the same, as it requires this amount to exhaust the roots.

For Lin. Tereb. and Tereb. Acet. see p. 105.

Liquors.—Only one is dropped—Liq. Atropiæ, but ten new ones are inserted, viz. :—

Liq. Acidi Chromic.

Liq. Ferri Acet.

„ Ammonii Acet. Fort.

„ Ferri Acet. Fort.

„ Ammonii Citrat. Fort.

„ Ferri Dialysatus

„ Arsenii et Hydrarg. Iodidi

„ Morphinæ Bimeconatis

„ Calcii Chloridi

„ Sodii Ethylatis.

Lozenges.—A new one has been introduced, but it is made

according to the old formula with acacia, &c. It is a pity the Council did not give us something more modern, especially as santonine was just the sort of substance to suggest it. Better lozenges than the official have been in constant use for many years, and at the Cambridge meeting of the British Med. Ass., 1880, the author took the trouble to expound the various methods of making them, but the well-worn formula retains its place. The admission of another article (*Tabellæ*) for nitro-glycerine might have suggested further latitude, though the Pharmacopœia Committee refrain from telling us how to make their tablets.

Trochisci Santonini, made like the other trochisci in quantities of 720 at a time, each to contain one grain. It would be much better to use the crystals unpowdered, and make chocolates, rocks or candies, or pastilles. The object is to give the santonin as a sweetmeat, and for this the unbroken crystals in a softer vehicle would be better. Dose, &c.—Says the B. P., 1 to 6 lozenges, but one might be too much for a young child. Doses of $\frac{1}{2}$ a grain or a $\frac{1}{4}$ grain are often sufficient for children of two years and under. The adult dose of santonin is only 2 to 6 grains, and the larger quantities often give rise to unpleasant effects.

Essential Oils.—Three, viz., Ol. Eucalypti, Ol. Santali, and Ol. Pini Sylvestris are added.

Two *stearoptenes* (Thymol and Menthol) and one *oleo-resin* (of cubeb) may be grouped here. (pp. 57—59.)

Plasters.—Emp. Belladon. is now to be made with the new alcoholic extract of the root—1 part to 2 parts each of Emp. Resinæ and Emp. Saponis. The product will look very different to the old plaster made with green extract of the leaves.

Curd soap is to replace hard soap in Emp. Resinæ and Emp. Saponis Fuscum (the new name for Emp. Cerati Saponis).

The proportion of lead oxide in Emp. Plumbi is increased to 5 parts, to 10 of oil, and 5 of water, all by weight.

Spirits.—Two, Sp. Cinnamomi and Sp. Ætheris comp., are added. Sp. Æth. Nit. and Sp. Am. Arom. are altered. (pp. 23—41.)

Tinctures.—One is omitted, castor, and takes with it castoreum itself; but there are five new tinctures, viz. :—

Tinct. Cimicifugæ
 „ Gelsemii

Tinct. Jaborandi
 „ Podophylli
 „ Chlorof. et Morphinæ.

Some changes are made in Tinct. Iodi., Kino, Quin., &c. (See those drugs.)

Ointments.—One ointment is omitted, that of Cadmium Iodide, and the metal itself ceases to be official. But 10 ointments are added, viz. :—

Ung. Acidi Borici	Ung. Eucalypti
„ „ Carbolic	„ Hydrarg. Nitrat. Dil.
„ „ Salicylici	„ Iodoformi
„ Calaminæ	„ Staphisagriæ
„ Chrysarobini	„ Zinci Oleati

Vinegars.—In Acetum Scillæ, the spirit is now omitted. It was a mistake ever to have used it. It would have been better still to use a stronger acid—say 1 to 5, instead of the diluted acetic, which is only 1 to 7.

Wines.—Vin. Ipec. is quite a new article. (p. 104).

Besides these, the following groups are affected by the entrance or exit of one preparation into each, viz. :—

Admitted.

Suppositoria Iodoformi
Vapor Ol. Pini Sylvest.

Excluded.

Mist. Gentianæ
Pilula Quiniæ
Syrupus Rhamni
Succus Rhamni

NEW GROUPS.

(1) *Lamellæ*, translated “discs,” and defined merely as “discs of gelatine, with some glycerine, each weighing about $\frac{1}{10}$ grain and containing”—the amount of the remedy respectively appropriate. Many will expect more definite information, although this kind of preparation is in common use. The official discs are three, viz., *Lamellæ*—*Atropinæ*, $\frac{1}{1000}$ grain; *Cocainæ*, $\frac{1}{200}$; *Physostigminæ*, $\frac{1}{1000}$. They are evidently intended for ophthalmic use, but similar discs are employed in hypodermic medication, after Dr. Sansom’s suggestion, and the word *lamel* has also been attached to Savory and Moore’s larger gelatine doses intended to be taken by the stomach. It will be necessary to discriminate what is intended now the B. P. has appropriated both names—*Lamellæ* and the constantly inaccurately applied word *discs*.

(2) *Oleates* of mercury and zinc (with one ointment of the latter oleate) are introduced into the B. P., and duly described further on. (See Oleic acid, Mercury, and Zinc.)

(3) *Tabellæ*.—Another form of lozenge, called tablets, is introduced, but only one article gets the name, and no information as to preparation is vouchsafed. (See Nitroglycerine, the only remedy of which tablets are official, p. 26.)

PROCESSES.

Standardising is ordered with a view of securing a constant strength of certain preparations. Thus, Ext. Cinchon. Liq. is to be adjusted to 5 per cent. of total alkaloids. Ext. Opii to "about 20 per cent. of Morphine." Ext. Opii Liq. to "about 1 per cent. of Morphine." Ext. Nucis Vom. to about 15 per cent. of alkaloids. Aq. Laurocerasi is to be adjusted to 0.1 per cent. of Hydrocyanic Acid. It seems a pity this last preparation was not expunged from the B. P. altogether.

Powdering is now, in some instances, graduated by the method adopted from the U. S. P., of passing the substance through sieves of particular sized meshes. The numbers of the powders are from 40 to 60, and signify the numbers of parallel wires per inch in the sieve required.

OMISSIONS.

The articles and preparations excluded from the new B. P. are only twenty-two. Those not mentioned in the foregoing groups are as follows:—Areca; Digitalinum; Ferri Iodid.; Ferri Oxid. Magnet.; Ferri Perox. Humid.; Stramonii Folia. A complete list is given on p. 112.

Some will regret one and some another of the omissions, but all may console themselves by the reflection that exclusion from B. P. does not forbid the use of remedies, or what should we have done, lo! these eighteen years, without those which were waiting for admission? Many more will regret that the pruning knife has been so sparingly applied. There would be less objection to retaining articles not often employed if students were not expected to get up minute details concerning them.

ADDITIONS.

These are 114 in number, but many are only new preparations of medicines already official. The additions and other important alterations will now be described at length, under the official names of the respective remedies.

NEW OFFICIAL ACIDS.

TEN new preparations are introduced into the new Pharmacopœia under the term Acidum. One of these, Acidum carbolicum liquefactum, which is made by adding 10 per cent. of water, is a phenyl alcohol, and will be considered in the next section with allied Carbon compounds. Salicylic acid and other salicyls will also be left to the next section, and form a therapeutical group by themselves. The remaining eight are either inorganic or organic.

(a) Inorganic—viz., boric, chromic, hydrobromic, phosphoric (concentrated).

(b) Organic—viz., lactic, diluted lactic, meconic, oleic.

But besides these additions there are changes in previously official acids. Thus, acid. sulph. aromat. and acidum sulphurosum are so altered as to demand consideration, and will be noticed after the new acids.

ACIDUM BORICUM.—BORIC ACID, H_3BO_3 .

Boric (or boracic) acid is a weak acid obtained by the purification of native boric acid, or by the action of sulphuric acid on borax. The sparingly soluble boric acid is precipitated, and the sodium sulphate removed by decantation and filtration.

Characters and Tests.—Colourless, pearly, lamellar crystals or irregular masses of crystals; easily powdered; unctuous to the touch; taste feebly sour and bitter and leaving a sweetish after-flavour. Soluble in 25 parts of water, 5 of glycerine, 16 of rectified spirit at 60° F. (15°·5 C.), and in 3 of boiling water. It changes the colour of litmus to wine-red; turmeric paper moistened with an aqueous solution slightly acidified with hydrochloric acid, becomes brownish red on gently drying, and this colour changes to a greenish if solution of potash be added. The alcoholic solution burns with a greenish flame. The crystals liquefy when warmed, and on careful ignition lose 43½ per cent. of their weight, the product solidifying,

on cooling, to a brittle glass-like mass. Aqueous solution should not yield more than a faint opalescence with chloride of barium, nitrate of silver, or oxalate of ammonium ; nor any precipitate with sulphhydrate of ammonium ; nor a strong persistent yellow tinge to a spirit or air-gas flame.

Dose.—5 to 30 grains.

Boric acid has been promoted to the body of the Pharmacopœia from the Appendix, in which it stood, the sole use formerly assigned to it being as a test for the adulteration of rhubarb by turmeric (which boric acid turns red); though it was at one time prescribed as a sedative in cerebral affections, and was also employed in some forms of heartburn, but fell into disuse.

The development of antiseptic surgery led to the use of various agents which were found destructive to the life of minute organisms. Boracic or, as we must now call it, boric acid possesses this property in a high degree, and moreover has the advantage of causing little or no irritation to the tissues, and although large doses administered internally would set up gastro-intestinal inflammation, it is not practically poisonous. It is therefore well adapted for surgical dressings, but as the effect does not pass beyond the surface with which it is in contact, it is not to be trusted for dressing cavities. Fomentations, lotions, ointments are freely used to wounds and ulcers. Fomentations, being hot, can of course be used of greater strength than cold lotions. For the latter a saturated solution (1 in 25) is sometimes employed. For skin disease 1 in 40. For collyrium 5 grains in 1 oz., in purulent ophthalmia. Boric lint and other dressings have been extensively employed in the antiseptic system.

Lint dipped in a boiling, saturated solution and dried retains nearly half its weight of the acid, and is known as boracic or boric lint. Cotton wool prepared by the same method is often useful. Mixed with starch, the finely powdered acid makes an antiseptic nursery and toilet powder, and is also useful to correct ill-smelling perspiration and for skin diseases. Finely powdered, either pure or diluted, according to circumstances, it is also an innocuous antiseptic, suitable as a snuff in nasal diseases, as an insufflation in laryngeal, faucial, and aural diseases, when a dry application is desirable.

“*Boro-glyceride*” is the name given to a combination made by saturating the acid in glycerine with the aid of heat, and

which has been patented by Mr. Barff as a preservative of food. Milk and cream, to which a small quantity of this compound is added, will keep sweet for days, and meat, game, &c., painted with it or immersed in it, are also preserved. The applications of such a preservative must be numerous. Boro-glyceride can be made by heating (in an evaporating dish) 92 parts of glycerine and 62 of boric acid, but being made on a large scale as a preservative, it is easier to buy it from the company which owns Barff's patent. The glyceride mixes freely with water, and can, therefore, be used for making lotions, &c. When made as directed and the heat kept up until the product ceases to lose weight, the residue weighs 100 parts, is very hygroscopic, and looks like ice or glacial phosphoric acid. If to this 100 parts of glycerine be added, a preparation of about the consistence of honey is obtained, which Dr. Turnbull (*Arch. Ophthalm.*) advises in trachoma after the purulent discharge has ceased. He cleanses the lids and brushes the solution over or drops it into the eye twice a day. This 50 per cent. solution is also useful as a vehicle for tannin, iodine, carbolic acid, resorcin, iodoform, morphia, &c.

Internally, Boric acid is not much used, but has been tried in septic conditions. It has also been proposed in sarcina, &c., instead of sulphurous acid or the sulphites. Perez found it rapidly removed a foetid and ammoniacal condition of the urine. Dose, 5 to 30 grains.

UNGUENTUM ACIDI BORICI.—Ointment of boric or boracic acid. (Boric acid in fine powder, 1 part; soft paraffin, 4; hard paraffin, 2; melt the paraffins together, sift in the acid over the surface, and stir until cold.) This is an improvement on Lister's ointment, which contained wax and oil. In these proportions the two paraffins give a consistence which is a suitable average for this climate; but, of course, the proportions can be varied, if necessary, according to the temperature.

ACIDUM CHROMICUM.—CHROMIC ACID.— CrO_3 .

Synonyms.—Anhydrous Chromic Acid; Chromic Anhydride.

This is not a true acid, but an anhydride.

Prep.—Take of bichromate of potassium, 30 oz. ; Sulphuric acid, 57 fluid oz. ; distilled water, a sufficiency. Dissolve the bichromate

n a mixture of 50 fluid oz. of the water and 42 fluid oz. of the acid. Set aside for twelve hours, and decant the liquor from the crystals of acid sulphate of potassium that separate. Heat the liquor to about 185° F. (85° C.), add the remainder of the acid, and water sufficient to just redissolve any crystals of chromic acid that may have formed. Allow to cool, collect and drain the crystals, and dry on porous tiles at a temperature not exceeding 100° F. (37°·8 C.) in an air bath. From the mother liquor more crystals may be obtained on evaporation.

Characters and Tests.—Crimson acicular crystals, very deliquescent, inodorous, corrosively caustic to the skin. At a high temperature it melts, and at a still higher temperature decomposes, with the evolution of oxygen gas, leaving a greenish-black residue. Warmed with hydrochloric acid, chlorine is evolved. Mixed with cold alcohol, aldehyd is evolved, and a green residue remains. It is soluble in water, yielding a deep orange-red solution. If placed in contact with alcohol, glycerine, and some other organic matters, sudden combustion or explosion may ensue. One or two grains dissolved in two or three oz. of water should afford only a faint opalescence with chloride of barium.

Chromic acid is a very potent caustic, but, though it penetrates deeply, causes less pain than the other strong mineral acids. It coagulates albumen, is fatal to low organisms, and decomposes ammonia and sulphuretted hydrogen. Moreover, it is a powerful oxidiser of organic matter, rapidly parting with its oxygen. It thus deodorises, and may be used as a preservative and disinfectant. The solution appears to dissolve the tissues to which it is applied, and is used to remove warts, corns, condylomata, &c. It has been applied as a paste to morbid growths, cancerous tissue, hæmorrhoids, &c. To superficial diseases it may be applied by means of a glass rod, which may be dipped into the liquid resulting from the spontaneous deliquescence of the crystals or the new *liquor*, which may also be used for poisoned wounds or phagedænic ulcers. This caustic is also used in uterine diseases, as well as in morbid growths in the nose, mouth, pharynx, and even larynx. In the last it requires the utmost caution, and has occasionally, in the hands of skilful specialists, proved injurious.

The best mode of using the caustic is to cautiously fuse a minute quantity on to the end of a silver or aluminium probe. With this the part can be lightly touched. Excess of acid may be neutralised by soda, and the application should not be repeated until the eschar has fallen and all inflammation has

subsided. This plan has been found useful in the pharynx, nasal passages, and has been extended to the larynx, but there demands more care. The *liquor* (1 in 4) may come to be used with cotton-wool perhaps, or for painting. Diluted 10 times, so as to give a solution of 1 in 40, it may be applied to the mouth or fauces chiefly in syphilitic cases. Still more diluted it furnishes a deodorising lotion in ozæna. Gonorrhœa, leucorrhœa, and other discharges have also been treated with weak solutions. These should not contain glycerine, alcohol, or other organic matters; nor should such be used for making a paste, on account of the action mentioned under Characters and Tests.

LIQUOR ACIDI CHROMICI (by dissolving 1 of acid in 3 of water) contains the equivalent of 25 per cent. of chromic anhydride CrO_3 , or 29.5 per cent. real acid H_2CrO_4 . It is an orange-red caustic acid liquid. Sp. gr. 1.185. *Use*, as above.

ACIDUM HYDROBROMICUM DILUTUM.

(Diluted Hydrobromic Acid).

An aqueous solution containing 10 per cent. by weight of gaseous or real hydrobromic acid, HBr .

Take of bromine 1 fluid oz.; distilled water and sulphuretted hydrogen, of each a sufficiency.

Place the bromine in a glass cylinder and pour over it 15 ozs. of the water. Pass a current of sulphuretted hydrogen gas into the bromine until the red colour of the aqueous liquid has disappeared. Filter the fluid, and distil the filtrate. Reject the distillate until it is free from odour of sulphuretted compounds, and then collect it until sulphuric acid begins to distil. Dilute the distilled acid with water until it has a specific gravity at 60° F. (15.5° C.) of 1.077. Preserve in glass-stoppered bottles.

From the rejected distillate more hydrobromic acid may be obtained by redistillation.

Characters and Tests.—A colourless, inodorous liquid, having a sour taste and acid reaction. Evaporated to dryness, it leaves little or no residue. Chlorine water liberates bromine, colouring the fluid yellow. With nitrate of silver it yields a white curdy precipitate insoluble in nitric acid, and only sparingly soluble in solution of ammonia; no precipitate with chloride of barium; and does not become discoloured on keeping. 810 grains by weight

require for neutralisation 1,000 grain-measures of the volumetric solution of soda.

Dose.—15 to 50 minims.

This is introduced from the U. S. P., and is of the same strength. Hydrobromic acid possesses to a considerable degree the properties of the bromides, but has not been considered so generally useful. It has the advantage over potassium bromide of not producing to the same extent, or so frequently, a feeling of depression; which is perhaps due to the base, as the sodium salt now made official is in this respect preferable. (See p. 39, *note*.) Another reason may be in the dose, which is usually limited to two fluid drachms—an amount only equal to about eighteen grains of potassium bromide.

The B. P. dose being stated at 15 to 50 minims, it would appear that it was not contemplated to use it instead of the bromides in epilepsy and grave diseases, but rather as a sedative in nervous irritation, headache, tinnitus, and other cases, in which it has often been found useful. It is often used as a solvent in quinine mixtures to prevent cinchonism, and in the same way is said to prevent the unpleasant after effects of opiates; also to relieve nervous symptoms set up by excess of tea, &c.—alcohol even. In throbbing or pulsating tinnitus aurium it sometimes affords relief.

Dose.—15 to 50 minims; but more may be given if properly diluted.

ACIDUM PHOSPHORICUM CONCENTRATUM.

Concentrated Phosphoric Acid.

This new concentrated acid consists of phosphoric acid H_3PO_4 , with 33.7 per cent. of water. It may be made by oxidising phosphorus by heating it in a proper apparatus with nitric acid, until nitrous fumes cease to form and adjusting to the required strength.

Phosphoric acid may also be prepared from phosphorus by treatment of the product of atmospheric oxidation with water and a little nitric acid.

Characters and Tests.—A colourless syrupy liquid with a sour taste and strongly acid reaction. With ammonio-nitrate of silver its diluted solution gives a canary-yellow precipitate soluble in

ammonia and in diluted nitric acid. Evaporated it leaves a residue which melts at a low red heat, and upon cooling exhibits a glassy appearance. After dilution it is not precipitated by sulphuretted hydrogen passed through the hot solution for a few minutes, nor by chloride of barium, nitrate of silver acidulated with nitric acid, or solution of albumen; and if neutralised by ammonia, and then a slight excess of acetic acid added, oxalate of ammonium does not immediately cause turbidity. When mixed with an equal volume of pure sulphuric acid, and then introduced into solution of sulphate of iron, it does not communicate to it a dark colour. Diluted and mixed with an equal volume of solution of perchloride of mercury and heated, no precipitate is formed. 73·8 grains by weight of it mixed with 180 grains of oxide of lead in fine powder leave by evaporation a residue (principally phosphate of lead) which after it has been heated to dull redness weighs 215·5 grains.

Dose.—2 to 5 minims.

Preparations containing Phosphoric Acid.—Acidum Phosphoricum Dilutum; Syrupus Ferri Phosphatis.

Official Phosphates are those of Ammonium, Calcium, Iron, and Sodium.

The only reason for introducing this acid is that it is employed in the modified process for making Syrupus Ferri Phosphatis (p. 48), but the dose is specified as 2 to 5 minims. Obviously the diluted acid, as heretofore, is best adapted for administration internally, and although that is now made by simple dilution (3 oz. of the concentrated, in 20 oz.), its strength, and therefore its dose, remains unaltered.

It may be supposed that the term “concentrated” was introduced for the purpose of preventing the erroneous substitution of the stronger for the weaker acid, but this last having long been officially known as *dilutum*, thus coupling it with the other medicinal mineral acids, and the word concentrated not being applied to them, it seems unnecessary here. The word seems to have been suggested by the process, but it is not usual thus to name official products. Probably the adjective will in a future edition be dropped, and the concentrated acid will be as seldom ordered internally as the analagous strong mineral acids. The U. S. P., from which the new acid is taken, names it simply phosphoric acid.

ACIDUM PHOSPHORICUM DILUTUM is made by diluting 3 fluid ozs. of the concentrated acid with enough water to make 20 fl. ozs. It may be prepared from an acid of other strength by bringing it to sp. gr. 1·08. It corresponds to a 10 per cent. solution of phosphoric anhydride P_2O_5 , and to

the diluted acid of the former B.P., and has the same characters and tests.

ACIDUM LACTICUM—LACTIC ACID— $\text{HC}_3\text{H}_5\text{O}_3$.

Lactic acid, with about 25 per cent. of water. Produced by the action of a peculiar ferment on solution of sugar and subsequent purification of the product.

Characters and Tests.—A colourless syrupy liquid, inodorous, with a pure acid taste, and acid reaction on litmus. Specific gravity 1.21. Miscible in all proportions with water, rectified spirit, and ether, nearly insoluble in chloroform. Warmed with permanganate of potassium, it gives the odour of aldehyd. It vaporises when heated, and yields inflammable gases when the temperature is about 350°F . (176.7°C .), at first burning with a blue flame which becomes more luminous as the temperature rises. When nearly all dissipated, the residue chars, and finally almost entirely disappears. A solution in about ten parts of water, neutralised by ammonia, is not precipitated by sulphhydrate of ammonium. Not more than a faint opalescence is produced with chloride of barium, nitrate of silver, or oxalate of ammonium, nor when boiled with excess of Fehling's solution is any precipitate formed. 120 grains require for neutralisation 1,000 grain-measures of volumetric solution of soda.

As a solvent of false membrane it may be freely used in croup and diphtheria, both for painting the fauces and in the form of spray. It is too often employed much too diluted to effect this object. The diluted acid, containing 15 per cent. of the strong, may be carefully used for painting. On one occasion I used the strongest acid I could procure. That was the U.S.P., the strength of which is now adopted for the B.P. For a spray 2 or 3 fluid drachms of the diluted acid may be used to begin with, increasing the strength as required. Glacial lactic acid, mixed with an equal part of silicic acid, is recommended by Lurtz for destroying lupus. He says it is not very painful, and does not affect the healthy tissue.

Internally, it has been used instead of hydrochloric acid in indigestion—especially in combination with pepsine. Also, for its remote effect in hindering the formation of phosphatic deposits and diminishing abnormal alkalinity of the urine. It has also been employed by Cantani and others with some success in diabetes—in conjunction with an exclusively meat

diet—about $\frac{1}{2}$ ounce in a pint of water being taken daily. In country places, buttermilk, also a popular remedy, might be used instead.

ACIDUM LACTICUM DILUTUM (15 per cent.) is made by adding to 3 oz. of Lactic Acid enough distilled water to fill exactly 1 pint. The dilute acid has sp. gr. 1.040, and the dose is $\frac{1}{2}$ to 2 drachms.

ACIDUM MECONICUM—MECONIC ACID— $\text{H}_3\text{C}_7\text{HO}_7$.

An acid obtained from opium.

Characters and Tests.—In micaceous crystals, nearly colourless, sparingly soluble in water, readily in alcohol, strongly acid taste and reaction, coloured red by neutral solution of perchloride of iron, the colour being discharged by strong but not by diluted hydrochloric acid, no precipitate with solution of iodine and iodide of potassium.

Meconic acid is said to have a feeble narcotic action, but this is doubtful. It has been conjectured that it modifies the action of substances with which it unites, as the morphine in opium, and it is introduced into the Pharmacopœia only for the purpose of making Liq. Morphinae Bimeconatis (vide p. 89). Its reactions are important, as they are utilised to detect the presence of opium.

ACIDUM OLEICUM.—OLEIC ACID.

$\text{HC}_{18}\text{H}_{33}\text{O}_2$.—A fluid fatty acid, obtained by the saponification of olein, or by the action of superheated steam on fats with subsequent separation from solid fats by pressure. Usually not quite pure.

Characters and Tests.—A straw-coloured liquid, nearly odourless and tasteless, with a very faint acid reaction. Unduly exposed to air it becomes brown and decidedly acid. Specific gravity 0.860 to 0.890. Insoluble in water, but readily soluble in alcohol, chloroform, and ether. At 40° to 41° F. (4°.5 to 5° C.) it becomes semi-solid, melting again at 56° to 60° F. (13°.3 to 15°.5 C.). It should be completely saponified when warmed with carbonate of potassium, and an aqueous solution of this salt neutralised by acetic acid, and

treated with acetate of lead, should yield a precipitate which, after washing with boiling water, is almost entirely soluble in ether.

Preparations containing Oleates and Oleic Acid.—Oleatum Hydrargyri ; Oleatum Zinci ; Unguentum Zinci Oleati.

This acid is only introduced for the purpose of making the oleates, which possess considerable advantages over ointments, as they are much cleaner, easily applied, do not require rubbing in, and are easily absorbed. They are, however, more irritating to the skin, and unless diluted, the oleic acid produces an eruption. The term oleate must not be regarded too critically, as it is scarcely applicable to the preparations thus named, which are solutions of metallic oxides in oleic acid. The word oleatum looks as if intentionally made to differ from oleas, which has been in common use, and the student may think it is intended as an adjective ; but the Council do not write hydrargyrum or zincum oleatum, but oleatum hydrargyri and zinci, and they put both preparations under the letter O, always placing the word oleatum first.

True oleates, in the form of amorphous powders, have recently been used as applications in affections of the skin. Oleic acid was proposed as a solvent of mercurial oxide by Prof. Marshall in 1872, and his oleate of mercury soon came into use. Morphia, too, was often added. The terms Lin. Hydrarg. Oleatis and Ung. Hyd. Oleatis were applied by several hospital pharmacopœias (London, Univ. Coll., Throat, &c.), and might well have been officially used now that pure chemical oleates are coming into use. Dr. Shoemaker strongly advocates (*Lancet*, 1884) the use of pure oleates of metals and alkaloids, and says lard is a better medium for ointments than paraffins, which do not so easily permit absorption. He has introduced mercurous (in addition to mercuric) oleate, and considers it the proper one to use for inunction treatment of syphilis: it is $1\frac{1}{2}$ times as powerful as mercuric oleate.

CHANGES IN FORMERLY OFFICIAL ACIDS.

ACIDUM SULPHURICUM AROMATICUM is no longer made by digesting the cinnamon and ginger in the fluid, but the spirit and tincture are respectively employed. The strength, too,

is a little altered, bringing it nearly up to *Acid. Sulph. Dilut.*

PREP.—Strong tinct. ginger 1, spirit cinnamon 1, rectified spirit 18, sulphuric acid $1\frac{1}{2}$. Mix the acid gradually with the spirit, and then add the tincture and sp. cin. Acid sulph. aromat. now enters into infusion of cinchona (2 drachms in 1 pint). The sp. gr. of this acid is calculated at 0.911 instead of the former 0.927, and six fl. drachms contain about 37.5 grains of real acid, H_2SO_4 , instead of 33.2 as formerly.

Acid Sulph. Dil. is prepared as heretofore, and the strength is, therefore, unaltered. Sp. gr. still given, 1.094; but the calculation is made of 49 grains of H_2SO_4 for the 6 fl. drachms. Why not have made the acidity of the two equal? Of course a little difference in the sp. gr. would have been present, but that would not have mattered.

If the aromatics are best extracted by an acid liquid, that would be a good reason for having an official preparation. But now that Tincture of Ginger and Spirit of Cinnamon are merely mixed with acid and spirit, we may well ask whether the B.P. might not be better disencumbered of this preparation, and prescribers left to order extemporaneously such aromatics as they may think proper to add to their acid mixtures. The new preparation is paler than the last. For an extemporaneous form, perhaps for a stock one, tincture of Cinnamon is better than the new spirit.

ACIDUM SULPHUROSUM is altered in strength, 30 fl. ounces of water being required in the process, and the product is required to be adjusted to the strength of 5 per cent. by weight of the solution = 6.4 per cent. H_2SO_3 . The sp. gr. is to be 1.025, and in the official test 64 grains will be required instead of 34.7 for the 1000 measures of iodine solution.

Still the official dose is left 30 to 60 minims.

A salt of this acid now becomes official. The

SODII SULPHIS, Sulphite of sodium Na_2SO_3 , $7H_2O$, is obtained by the action of sulphurous acid on sodium carbonate or on caustic soda, and is conveniently considered with the acid.

Characters and Tests.—Colourless transparent monoclinic prisms, efflorescent in dry air, inodorous, with a cooling saline and sulphurous taste. It is readily soluble in water, very soluble in spirit. The aqueous solution has a neutral or faintly alkaline reaction, imparts an intense yellow colour to flame, and if treated with hydrochloric acid evolves a sulphurous vapour, but does not become cloudy.

Dose.—5 to 20 grains.

This salt may be used for the antiseptic and antizymotic properties of its acid, when that is liberated. As a mouth wash and gargle (1 in 8) it removes *oidium albicans*. As a lotion, in parasitic skin diseases. Taken into the stomach in *sarcina ventriculi*. It has been used also internally in septic conditions with the idea that it would act in the blood, and even to check ammoniacal decomposition of the urine in the bladder. It is probable that no considerable proportion is absorbed as such, but as sulphate, into which it so easily is transformed, though it is said that sometimes a portion has escaped unchanged in the urine.

Hyposulphites may be used to arrest fermentation and decomposition, and have been held by Polli to be more powerful antiseptic remedies.

ALCOHOLS AND OTHER CARBON COMPOUNDS.

The additions of this class are Alcohol Ethylicum; Liquor Sodii Ethylatis; Spiritus Ætheris Compositus; Butyl-chloral Hydras; Iodoform; Liquefied carbolic acid, in connection with which we shall take two new salts—sulpho-carbolate of sodium and of zinc; Paraffins (hard and soft); Nitro-glycerine; the Salicyls (salicin, salicylic acid, and salicylate of sodium). Sp. Æther. Nit. is again altered (p. 23).

ALCOHOL ETHYLICUM—ETHYLIC ALCOHOL.

Absolute alcohol is the common synonym for ethylic alcohol, C_2H_5HO , now first made official. It is spiritus rectificatus from which the water has been removed by further rectification by the aid of anhydrous potassium carbonate and calcium chloride until a sp. gr. is attained of 0.797 to 0.800. It therefore contains at most 2 per cent. of water as against the 16 per cent. of sp. rect., and should stand all purity tests.

This is introduced for the purpose of making liq. sod. ethylatis. One per cent. by weight is also now directed to be added to chloroform at the conclusion of the distillation.

Rectified spirit and proof spirit continue in their places. The formula of rectified is now given C_2H_5HO , and it is stated that proof spirit contains about 49 per cent. by weight, and about 57 per cent. by volume, of absolute alcohol.

LIQ. SODII ETHYLATIS, a powerful caustic proposed by Dr. B. W. Richardson as particularly suitable for the removal of nævi. Has been used to destroy other superficial growths. Applied carefully with a glass rod or glass brush. It is also applicable for the treatment of easily accessible nasal polypi.

It causes less pain than some other caustics. Should severe pain be produced, it may be arrested by dropping chloroform on the part, as that converts the ethylate into ether and sodium chloride. Its action depends on the liberation of sodium when it is brought into contact with tissue.

It is made by carefully dissolving sodium 1 pt. in ethylic alcohol 20, and should be kept in a cool place, as in warm situations it may explode.

SPIRITUS ÆTHERIS COMPOSITUS.

Compound Spirit of Ether.—*Syn.*, Hoffmann's Anodyne.

Gradually mix thirty-six fluid ounces of sulphuric acid with forty fluid ounces of rectified spirit, and let the mixture stand for twenty-four hours. Then distil until the fluid in the retort begins to blacken. Shake the distillate with lime-water to neutralise any acid, and remove the supernatant liquor and expose it to the air for about twelve hours. Pour three fluid drachms of the resulting liquid into a mixture of eight fluid ounces of ether and sixteen fluid ounces of rectified spirit.

Many practitioners will welcome back the favourite Hoffmann's anodyne now restored to the Pharmacopœia; for since its exclusion various modes of preparing it have been employed, resulting in very inferior and often useless articles.

In the first part of the process ethereal oil is produced with a little ether and sulphurous acid. The latter is neutralised by the lime-water, and the former escapes by evaporation during the exposure to the air. The "resulting liquid," ethereal oil, is then mixed with ether and spirit. No description, characters, or tests are given of this preparation, or of the ethereal oil, which is not separately admitted to the B. P. This may almost be regretted, as it is desirable to have the preparation precise, and everything depends on the quality of the *ethereal oil*—which is the main ingredient, and is formed when alcohol is distilled with a large excess of sulphuric acid. It is a mixture of ethyl sulphate $(C_2H_5)_2SO_4$, ethyl sulphite $(C_2H_5)_2SO_3$, with ethylene C_2H_4 , the sulphurous acid having been formed by reduction from sulphuric acid, which always takes place when ethylene is formed from alcohol, and more than one form of ethylene is supposed to be formed in this process. This ethereal oil, also named oil of wine, was once official, and no doubt possesses valuable medicinal properties, though it was only used in the one preparation, Hoffmann's anodyne, which owes its special properties to the oil. This oil is of a yellowish colour, has a penetrating, aromatic odour, and a sharp, somewhat bitter taste. It is very sparingly soluble in water, and if dropped into it, sinks to the bottom in separate globules. It is readily soluble in alcohol and ether, and should not have any acid reaction. When kept for a long time it is liable to acquire a brown colour, to separate into

two layers, and sometimes deposit prismatic crystals. This decomposition may be prevented for some time by mixture with an equal volume of ether.

Therap.—Sp. ætheris compositus combines with the stimulant, antispasmodic action of the ether which it contains, hypnotic and anodyne qualities, due to the ethereal oil. It is, therefore, useful to allay pain and nervous irritation, and conduce to sleep. It may be combined with morphia or laudanum. In spasmodic pains, in flatulent distension, colic, hysteria, and in other conditions it is freely prescribed. A fluid drachm will sometimes procure sleep in low fevers when opiates or chloral fail.

Official dose.— $\frac{1}{2}$ fl. drachm to 2 fl. drachms.

SPIRITUS ÆTHERIS NITROSI is now described as a spirituous solution containing nitrous compounds, aldehyd, and other substances. The distillation is to stay at 14 fl. oz. instead of 15 fl. oz., and then 2 pints of S. V. R., or as much as will make the product correspond with the B. P. test, added.

BUTYL-CHLORAL HYDRAS.

Hydrate of Butyl-Chloral.—*Synonyms.*—Hydrous Butyl-Chloral; Croton-Chloral Hydrate, wrongly so called.

$C_4H_5Cl_3O, H_2O$.—Butyl-chloral, produced by the action of dry chlorine gas on aldehyd cooled to a temperature of $14^{\circ} F.$ ($-10^{\circ} C.$), separated by fractional distillation, and converted into the solid hydrous butyl-chloral by the addition of water.

Characters and Tests.—In pearly white crystalline scales, having a pungent but not acid odour, resembling that of hydrous chloral, and an acrid nauseous taste. It fuses at about $172^{\circ} F.$ ($77^{\circ} 8 C.$) to a transparent liquid, which, in cooling, commences to solidify at about $160^{\circ} F.$ ($71^{\circ} 1 C.$). Soluble in about fifty parts of water, in its own weight of glycerine and of rectified spirit, and nearly insoluble in chloroform. The aqueous solution is neutral or but slightly acid to litmus paper. It does not yield chloroform when heated with solutions of potash or soda or with milk of lime.

Introduced as a safer hypnotic than chloral hydrate, and as possessing the power of producing anæsthesia in the region of the trigeminus prior to its more general effects. It was therefore prescribed in toothache, facial neuralgia, tic, migraine, and other painful affections of the parts supplied by this trigeminus. In some cases, certainly, its effects are most

marked and rapid. For this purpose 1 or 2 grains may be taken in water every quarter or half hour until relief is obtained, or a total amount of 15 grains (which is not to be exceeded) has been taken. A more effectual plan is probably to give 5 grains for the first dose and follow on, if necessary, with 2 grains for 3 more doses; or 5 grains every half hour or hour for 3 doses only. If these do not relieve, it may be given up as a failure. O. Liebreich stated that the butyl-chloral had no depressant action on the heart, and it has therefore been recommended as a hypnotic when the other preparation was contra-indicated by cardiac weakness. It is possibly less depressant than chloral, and smaller doses seem required, but the statement that it does not depress the heart can scarcely be justified as intravenous injections were shown by I. V. Mering to arrest the cardiac beat, while moderate doses reduce the blood-pressure.

It has been given in other neuralgias, as of the limbs, but with less success. Dysmennorrhœa and other painful affections have also sometimes been relieved by a few doses. The taste may be covered by the addition of syrup of tolu. Orange flower water is a nicer vehicle. A strong solution in glycerine keeps well and is convenient.

IODOFORMUM. IODOFORM.

CH_3I .—A product of the action of iodine on a mixture of alcohol and solution of carbonate of potassium.

Characters and Tests.—Shining, lemon-yellow, crystalline scales; somewhat greasy to the touch; having a persistent and disagreeable odour and flavour. Very slightly soluble in cold water, more soluble in rectified spirit, soluble in chloroform or ether, readily and entirely soluble in warm ether; the solutions being neutral to litmus paper. When heated it first melts to a brown liquid, then gives off brown and violet vapours, leaving a black residue which entirely disappears on continued ignition. Warmed with an alcoholic solution of potash and the resulting fluid acidified by nitric acid, iodine is liberated, the mixture acquiring a brown colour, or, when cold, a blue colour on the addition of mucilage of starch.

Prep.—Suppositoria Iodoformi, 3 grains in each suppository; Unguentum Iodoformi, 1 part to 9 of benzoated lard = 1 in 10.

Dose.— $\frac{1}{2}$ to 3 grains.

Iodoform has been largely used in antiseptic surgery; in Germany it is used so freely that symptoms of poisoning

have not been uncommon. Large wounds and cavities have been-filled with the powder. There are, however, signs that reliance upon it is on the wane. Epidemics of erysipelas have broken out under its use, and confidence in its antiseptic value is shaken. It has, however, a remarkable influence over wounds, for which it will continue to be used. Unhealthy sores, chancres, and fungoid growths are favourably affected by it. It destroys many foul odours, but its own smell is to many very offensive.

Though it contains so much iodine, it is not irritant, but on the contrary a local anæsthetic. It is said as a suppository to produce unconsciousness of the act of defæcation, but after employing it in this form I have not yet met with such a result. It destroys organisms, but less powerfully than carbolic acid. Bougies for use in the nose in ozæna are used, and in the urethra they have been recommended in gonorrhœa. Iodoformed wool is also utilised for the nasal passages, and a solution in ether is used as a spray. Many obstetricians recommend an iodoform pessary to be employed after parturition.

Internally to replace iodine in scrofula, goitre, tumours, rickets, amenorrhœa, syphilis, phthisis, &c. It is easily tolerated by the stomach, and rapidly absorbed, the first step in this process probably being solution in such fatty matter as it may meet. This solution is then decomposed by albumen, as a compound of which it enters the blood. The iodine is eliminated by the kidneys in combination with sodium, just as when taken in other forms, but some iodoform seems to escape from the skin or lungs, as the person who has taken it for some time evolves the characteristic odour. I introduced its internal use to the Med. Soc. Lond., 1871. In late syphilis it is an excellent remedy, and can be continued for a long time: pills of 2 or 3 grains each, three times a day. When the mouth and fauces are affected, pastilles give the local, as well as general action. So do insufflations into the fauces. In phthisis smaller doses are often given, as it seems more apt to derange digestion.

After full doses have been taken for some time, the patient may lose his appetite, begin to find a taste of the iodoform, as well as its smell, always present, with, perhaps, some headache, depression, or faintness. He can then omit it a few days, and begin again. It seems like a saturation of the system, and serious symptoms will not occur if this indication

be noticed. It seems to depress the heart's action as well as the nervous system. Toxic symptoms have been observed chiefly when large quantities have been used to extensive surfaces. Vomiting, restlessness, delirium, and pyrexia occurred in some cases, but in others drowsiness and coma, or collapse. Again, some patients have had attacks of maniacal excitement, while others have suffered from profound melancholy. The pulse becomes frequent and feeble—sometimes rises to 150 or 180, but the temperature is scarcely affected. It is said that hourly doses of potassium bicarbonate have mitigated these symptoms, but they should not be produced by the internal use of the remedy. The author has used it for years in large doses, but has never had cause for anxiety.

Dose and administration.—In phthisis, 1 or 2 grains twice a day; in syphilis, 3 grains three times a day. It may sometimes be increased.

The odour is a great objection. Various substances have been tried to disguise it. Tannin has been advised, but it decomposes the iodoform. Volatile oils, as anise, fennel, &c., are sometimes used. Musk, tonquin bean, balsam peru, coumarin (10 per cent.), cinnamic acid, vanillin, &c., are recommended. I find storax efficient, and it is suitable for pills and other combinations.

Great improvements have been made in the manufacture, and an impalpable powder, obtained by precipitation, and with comparatively slight odour, may now be had. This powder, with half its weight or more of best storax, should be used for pills. The ointment and suppository would be improved by such addition.

SUPPOSITORIA IODOFORMI.—(3 grains in each made up with ol. theobrom.) have been used in enlarged prostate, fissure of the anus, and other local abrasions, as well as syphilitic affections of this part. I have on several occasions given great relief to piles by a suppository.

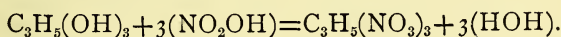
UNGUENTUM IODOFORMI.—(Iodoform, 1; benzoated lard, 9=1 in 10).

Though not so stated in the B. P., the iodoform should be in fine powder.

NITRO-GLYCERINE.

This dangerous explosive is not itself made official, but Tabellæ are introduced into the Pharmacopœia. It is made

by dropping pure glycerine into a mixture of nitric and sulphuric acids, washing, and cautiously drying at a proper temperature. When kept it undergoes partial decomposition, and in consequence of the pressure of the confined gases the slightest agitation may cause it to explode. Mixed with earth it forms dynamite. It is considered as a tris-nitrate of glyceryl, $C_3H_5(NO_3)_3$, formed by the substitution of the nitro-group (NO_2) for the three replaceable hydrogen atoms of the glycerine formula, thus:—



Nitro-glycerine resembles nitrite of amyl and other nitrites in its action. It was introduced by Mr. Field as a very powerful remedy in neuralgia and spasmodic diseases in 1858, his statements being confirmed by Augustus James, Thorowgood, Brady, and others (*Med. Times*, 1858). It fell into disuse, but has been successfully revived by Dr. Murrell as a remedy for angina pectoris and other conditions benefited by amyl nitrite. It is rapidly absorbed, and minute quantities produce immediate effects. Pulse and respiration are both rendered more rapid, blood pressure is lessened, headache and other sensible effects sometimes following. The sphygmographic tracing resembles that of amyl, with its rapid heart-beat and marked dirotism. But the amyl is more transient in its effects; consequently nitro-glycerine may be preferred where a more permanent effect is desired, though perhaps other nitrites may be found suitable for such cases.

Nitro-glycerine, as stated above, is a tris-*nitrate*, yet its action resembles that of a *nitrite*. This is, no doubt, because it is easily decomposed by alkalies, as Dr. Hay has shown that two-thirds of its nitric acid is reduced to nitrous. The nitrite would therefore be readily transformed in the blood, and the nascent nitrous acid would be very potent. The alkaline nitrites are not so rapidly absorbed as nitro-glycerine, and their effects are therefore less quickly produced, but still more permanent. Nitro-glycerine may be given in solution in water, or with a few drops of spirit of chloroform, or in peppermint or other aromatic water. A one per cent. solution in rectified spirit gives a non-explosive colourless fluid, with little taste or odour, which is convenient to keep. One minim of this ($=\frac{1}{160}$ gr.) is an average dose, and can be taken on a

lump of sugar, or in a drachm or more of the selected vehicle. Pills may be made with cacao butter, and, as taking time to dissolve, are a little slower in their effects. A very convenient method of administration is in lozenges or tablets made with chocolate, as proposed by Mr. Martindale, and now made official as

TABELLÆ NITRO-GLYCERINI.—Tablets of nitro-glycerine, for the making of which, curiously enough, no directions are given, the only information vouchsafed being that each is to weigh $2\frac{1}{2}$ grains, and contain $\frac{1}{100}$ gr. (one hundredth of a grain of pure nitro-glycerine). Neither nitro-glycerine (as stated above) nor chocolate are otherwise mentioned in the B. P.

Dose.—One or two tablets, in angina pectoris, neuralgia, vertigo, epilepsy, &c. Sometimes an attack of asthma is arrested by this remedy. Whenever it is desired to dilate the vessels and lessen arterial tension it may be tried. It has, therefore, been found useful when the heart is feeble from fatty degeneration or old age, and when arterial tension is high, as in Bright's disease. Has been given also in puerperal convulsions. Said to relieve sea-sickness, &c.

ACIDUM CARBOLICUM LIQUEFACTUM.

Liquefied carbolic acid is introduced as a distinct preparation, made by adding 10 per cent. of water to the pure acid, and, therefore, being of 90 per cent. strength. It is colourless, but acquires a slight reddish or brownish tinge. It will dissolve from 18 to 26 per cent. of water at 60° F. (15.5° C.), giving a clear, or nearly clear, solution, from which any slight coloured impurity will separate as dark, oily drops.

Dose.—1 to 4 minims. Used, of course, as carbolic acid crystals—the dose being 10 per cent. higher—or the salts may be used.

UNGUENTUM ACIDI CARBOLICI (carbolic acid 1, soft paraffin 12, hard paraffin 6; melt and stir constantly until cold). This ointment is of more solid consistence than the “vaseline” ointment in common use, and for some purposes is therefore to be preferred.

SODII SULPHOCARBOLAS.

Sulphocarbolate of Sodium.

Synonyms.—Sodæ Sulphocarbolas ; Sulphocarbolate of Soda.

$\text{NaC}_6\text{H}_5\text{SO}_4 \cdot 2\text{H}_2\text{O}$.—Obtained by dissolving carbolic acid in excess of sulphuric acid, supersaturating the liquid with carbonate of barium, filtering, and treating the filtrate with carbonate of sodium until no further precipitate forms. The filtrate from this mixture yields crystals of sulphocarbolate of sodium on evaporation.

Characters and Tests.—Colourless transparent rhombic prisms, inodorous or nearly so, with a cooling saline and somewhat bitter taste. Readily soluble in water, less so in spirit, the solutions being neutral to litmus. On ignition it gives vapours of carbolic acid and leaves a residue the solution of which in water affords a white precipitate with chloride of barium insoluble in hydrochloric acid. It imparts an intense yellow colour to flame. The dilute aqueous solution is rendered violet by solution of perchloride of iron ; it should not at once be rendered turbid by chloride of barium.

This new official salt is conveniently considered here. The sulphocarbulates were introduced by Dr. Sansom, under the impression that they would afford safe and more pleasant antiseptics than the free acid ; but some have thought that they were not decomposed in the blood, but excreted as taken. Two are now admitted to the B. P. The sodium salt is adapted for internal use.

ZINCI SULPHOCARBOLATIS is simply used as a topical astringent. (See Zinc, p. 54.)

PARAFFINUM DURUM ET MOLLE.

Hard and Soft Paraffin.

Characters of Hard Paraffin.—Paraffinum durum.—Paraffin ; Paraffin Wax ; Solid Paraffin.—Colourless, semi-transparent, crystalline, inodorous and tasteless, slightly greasy to the touch.

Specific gravity 0·82 to 0·94. Insoluble in water, slightly soluble in absolute alcohol, freely soluble in ether. It melts at 110° to 145° F. (43·3 to 62·8 C.), and burns with a bright flame, leaving no residue.

Characters of Soft Paraffin.—Paraffinum molle.—Petrolatum; Pétroléine; Unguentum Paraffinum.—White or yellowish translucent, soft, greasy; free from acidity, alkalinity, or any unpleasant odour or flavour, even when warmed to 120° F. (48°·9 C.) Specific gravity, at the melting point, from about 0·840 to 0·870. Melts at 95° to 105° F. (35° to 40°·5 C.), or even somewhat higher, volatilises without giving acrid vapours, and burns with a bright flame, leaving no residue. Insoluble in water, slightly soluble in absolute alcohol, freely soluble in ether, chloroform, benzol, &c. It is not saponified by solutions of alkalies.

Preparations.—Unguentum Acidi Borici; Unguentum Acidi Carbolici; Unguentum Acidi Salicylici; Unguentum Eucalypti; Unguentum Glycerini Plumbi Subacetatis; Unguentum Hydrargyri Oxidi Rubri; Unguentum Potassæ Sulphuratæ; Unguentum Sulphuris Iodidi; Unguentum Veratrinae. These are made with both paraffins.

The following ointments are made with soft paraffin only:—Ung. Hydrargyri Nitratis Dilut. and Ung. Zinci Oleati.

The word paraffin was coined by Von Reichembach from *parum affinis*, for a waxy substance he obtained in the destructive distillation of wood. It has since been applied to the white, waxy substance obtained by distilling the residuum from petroleum refining. It is purified by various processes. Pure paraffin is a white, waxy substance without odour or taste—softer than wax but harder than tallow. It is largely used in the arts, mostly for making candles. Paper coated with it is impervious to moisture. Lemons, meat, &c., are preserved by a coating easily applied by immersion in melted paraffin. It has sometimes been used to coat pills.

Petroleum may be regarded as a mixture of a number of hydro-carbons, with small amount of oxidation products. These hydro-carbons are gaseous, liquid, and solid. The whole of the paraffin series, C_nH_{2n+2} , from marsh gas on to the hard paraffin, are present in fresh petroleum or earth oil, as well as members of the olefine series C_nH_{2n} , and the Benzol series C_nH_{2n-6} . The lighter ingredients are removed and separated from each other by distillation, according to their gravities, and constitute various commercial

products—benzine, gasoline, naphtha, &c. For illuminating purposes they are still further purified. Some of the heavier liquid hydro-carbons of both the paraffin and olefine series are separated for lubricating oils, and the more solid residues are also purified and utilised as paraffins, &c. Soft Paraffin has been in use for some years, and the hard and soft now become official as bases for ointments.

Paraffins keep well, do not usually irritate the skin, and readily mix with many active substances. The chief disadvantage of the softer varieties is a low melting point, and therefore a tendency to penetrate through the dressings. This is attempted to be remedied by mixing with the harder varieties, but great care will be required in making ointments with the two. Those known under “fanciful names” (vaseline, cosmaline, &c.) are sometimes asserted to be unchangeable in the air, and incapable of becoming rancid, but the statement is too absolute. Exposure to air and light will in time affect them. A smell of crude petroleum may indicate a change of this kind, or imperfect purification. The irritant property occasionally observed may have been due to such change or, perhaps, sulphuric acid or other agent used in purifying may not have been completely removed. Internally soft paraffin has occasionally been tried in bronchitis and phthisis, especially in the neighbourhood of the wells. *Huile de Gabian* is a French product of this kind. In most accounts, however, Dover’s powder, cubeb, or other medicine has been combined with the paraffin to make pills.

SALICYL COMPOUNDS.

It is convenient to group together the salicyls as we may call them.

ACIDUM SALICYLICUM.—SALICYLIC ACID.

$\text{HC}_7\text{H}_5\text{O}_3$.—A crystalline acid obtained by the combination of the elements of carbolic acid with those of carbonic acid gas and subsequent purification, or from natural salicylates such as the oils of wintergreen (*Gaultheria procumbens*, *Linn.*) and sweet birch (*Betula lenta*, *Linn.*).

Characters and Tests.—In white acicular crystals, inodorous, but light and easily, diffused and then irritating to the nostrils; taste at

first sweetish then acid. It is soluble in 500 to 700 parts of water at ordinary temperatures ; readily soluble in alcohol, ether, and hot water ; soluble also in solutions of citrate or acetate of ammonium, phosphate of sodium, or borax. The crystals melt at about 311° F. (155° C.) and below 392° F. (200° C.) volatilise without decomposition. The aqueous solution gives with solution of perchloride of iron a reddish-violet colour. An alcoholic solution allowed to evaporate spontaneously should leave a perfectly white residue.

Dose.—5 to 30 grains.

Preparation.—Unguentum Acidi Salicylici.

Official Salicylate.—Sodii Salicylas.

UNGUENTUM ACIDI SALICYLICI.—(Acid 1 part, soft paraffin 18, hard paraffin 9, melt, add the acid, and stir till cold.)

SODII SALICYLAS.—SALICYLATE OF SODIUM.

Synonyms.—Sodæ Salicylas ; Salicylate of Soda.

($\text{NaC}_7\text{H}_5\text{O}_3$)₂, H_2O .—Obtained by the action of salicylic acid on carbonate of sodium or on caustic soda.

Characters and Tests.—Small colourless, or nearly colourless, crystalline scales, inodorous, and having a sweetish saline taste. Slightly but completely soluble in alcohol, readily soluble in water. The solutions are neutral or faintly acid to litmus. When ignited, the salt evolves inflammable vapours, and a white residue remains which effervesces with acids and imparts an intense yellow colour to flame. Perchloride of iron colours a concentrated solution reddish-brown, and a dilute solution violet. If the aqueous solution be acidulated by nitric acid and the precipitate be dissolved by rectified spirit, the mixture is not rendered more than faintly opalescent by chloride of barium or nitrate of silver. It dissolves without coloration or effervescence in cold sulphuric acid.

Dose.—10 to 30 grains.

SALICINUM.—SALICIN.

$\text{C}_{13}\text{H}_{18}\text{O}_7$.—A crystalline glucoside obtained by treating the bark of *Salix alba*, *Linn.* ; *Bentl. and Trim. Med. Pl.* vol. iv. plate 234 ; and other species of *Salix*, *Linn.* ; and the bark of various species of *Populus*, *Linn.*, with hot water, removing tannin and colouring matter from the decoction, evaporating, purifying, and recrystallising.

Characters and Tests.—Colourless shining crystals with a very bitter taste. Soluble in about twenty-eight parts of water or a similar quantity of spirit at common temperatures; insoluble in ether. Sulphuric acid colours it red. A small quantity heated with a little red chromate of potassium, a few drops of sulphuric acid and some water, yields vapours of an oil having the odour of meadow-sweet. The crystals melt when heated, and emit vapours having the odour of meadow-sweet. On ignition in air it leaves no residue.

Dose.—3 to 20 grains.

Salicylic acid is a very powerful antiseptic and disinfectant. It arrests amoeboid movements and retards the out-wandering of leucocytes. It kills bacteria and other organisms, and inhibits their development, thereby preventing fermentation, putrefaction, &c. This property may be utilised to preserve milk and other easily changing organic matters. It is said to have been largely used to preserve certain wines, as well as dairy products. The addition of $\frac{1}{2000}$ to urine will prevent putrefaction. Not being poisonous, and comparatively not irritant, while free from odour, it is well adapted for surgical purposes, and antiseptic dressings prepared with it have been largely used. Wadding, wool, jute, &c., containing 3 to 10 per cent.; oil, 2 per cent.; ointment (now official, 1 in 28); lotions, 1 or 2 per cent., the solubility increased by addition of borax, sodium phosphate, or sodium carbonate. All these have been employed with effects scarcely, if at all, inferior to carbolic acid; but it is not volatile, and, therefore, must be brought into contact with the part.

Salicylic acid oxidises steel, and so spoils surgical instruments, and, in the form of spray, its irritant action on the nasal membranes sets up violent sneezing, while, of course, the solid condenses and adheres to the clothes. Though so little irritant in comparison to some agents, it should be recognised that it powerfully stimulates the local circulation, and in some situations may therefore be inappropriate.

The powdered acid is used as a local application, either pure or diluted with talc or other inert powder. It is thus used as an insufflation in diphtheria. It has been recommended to apply the pure powder for a couple of days to soft sores, and then dress them with simple ointment. It is useful as an anti-hydrotic to check the perspiration of phthisis and locally to arrest sweating of the feet; or the ointment may be used for

this purpose. Tallow with 2 per cent. is used to prevent sore feet in soldiers after marching. In solution the acid forms useful antiseptic lotions, gargles, mouth-washes, &c. ; to correct the fœtor of sores on the surface, of the expectoration, or of the breath ; to destroy the oidium of thrush, &c. It has also been used as an injection in gonorrhœa, leucorrhœa, &c., and as an enema, 1 in 300, in the dysenteric diarrhœa of children ; a little spirit is used to increase the solubility.

Sodium salicylate is not disinfectant until decomposed and the acid set free, and is therefore not adapted for the above purposes. Neither the salt nor the acid appear to be absorbed by the skin, though solutions have sometimes been applied to rheumatic joints.

Internally the salicyls are antiseptic, antipyretic, and anti-rheumatic. For the immediate effect the acid is given in sarcina ventriculi, and in other cases of dyspepsia to check fermentation and decomposition in the alimentary canal. In other cases the salt is preferred, as it is destitute of the local irritant action of the acid. As most of the acid, when taken into the blood, is at once converted into sodium salicylate, it is natural for the remote effect to administer that salt, though a portion, either in the blood or the tissues, unites with glycocoll to form salicyluric acid. It has been also conjectured that another portion is again set free by the carbonic acid of the blood-plasma in inflamed parts, and so acts on them locally as an antiseptic, but this seems quite hypothetical. In the intestines salicin is split up into glucose and saligenin, and this alkaloid in its turn into salicyluric, salicylic, and salicylous acids, the last of which is a local irritant.

The salicyls, though they scarcely affect the temperature in health, are most powerful *antipyretics*, a couple of doses often sufficing to reduce pyrexial temperature several degrees in the course of an hour or two. Their great power in this direction suggests that it is closely associated with their antiseptic influence, and that they perhaps are poisonous to the organisms which are supposed to set up certain fevers. Acting very rapidly and the effect soon passing off, the salicyls require to be given in frequent doses, and they must be continued some time after the fever has subsided, or relapse is likely to occur.

Salicylism, if we may coin a word, is easily produced, moderate doses soon setting up noises in the ears, headache, and giddiness, and other symptoms strictly analogous with those of cinchonism. Tolerance is soon established when

only moderate doses are given, especially of salicin. The acid and sodium salts are more apt to set up graver symptoms, and when pushed have given rise to collapse. After a transitory stage of excitement the fall of temperature and depression of the heart's action, with lowered blood pressure and relaxed vessels, are produced. The respiration is also depressed. In poisonous quantities the acid seems to produce death through paralysis of respiration. Delirium and other serious effects have sometimes followed the acid and the salicylate of soda. These have been thought to depend on the presence of impurities, and it has been suggested that they only occur when the artificial preparation is employed. In that case, the natural one should always be prescribed for internal use, and this is strongly urged by Professor Latham. Salicin can be taken in very large quantities without inconvenience; it seems tonic rather than depressant, is therefore not likely to cause collapse, and it can be continued for considerable periods.

As *anti-rheumatics*, the salicyls are most employed for their singular power over acute rheumatism—a power demonstrated in our own time by Dr. Maclagan, though the willow had for ages been considered febrifuge: its bark was recommended as equal to cinchona and salicin as a substitute for quinine.* The term anti-rheumatic may be, perhaps, permitted, for the action seems to be something more than anti-pyretic. The remedy reduces the pain as well as the fever, though it has no claim to be called an anodyne. Under its influence the swelling of the joints subsides, and the other symptoms disappear, so that it may be said to cure the disease. Yet, as already stated, relapses are apt to occur, as if the microzymes, if they exist, were only "scotched," not killed. In 24, 48, or 36 hours the salicyls will reduce the temperature of rheumatic fever to normal, relieve the patient's pain, and restore his appetite. Of course, it takes a little longer for the effusion into the joints to be reabsorbed. The effect is often so rapid and so complete that the patient does not like to remain in bed and continue the medicine—and yet if he does not, he will most likely have a relapse. The dose may be reduced, but the remedy should not be altogether omitted for 10 to 14 days.

* Author's "Respiratory Therapeutics," chap. xvi. Antipyretics.

Salicin, in large and frequent doses, is the best preparation in most cases. It is tolerated by the stomach when the other salicyls are rejected. If the others are preferred for any reason at first, this should be substituted after the first few days, as its tonic effect makes it additionally valuable.

The salicyls have been employed as antipyretics in typhoid and scarlet fever, in pneumonia and other febrile diseases, but in none so successfully as in acute rheumatism. In chronic rheumatism they are often said to be useless, but I have obtained a mitigation of the pain and abatement of temperature in the intercurrent, acute, or sub-acute attacks, by large and frequent doses of salicin. But the salicyls, although powerful antipyretics, are not able to cope with hyperpyrexia.

The salicyls are thought by some to be antiperiodic and antimalarial, but for such purposes they are inferior to quinine.

Salicylate of sodium is also given in bilious headache. It is said to promote the secretion of the bile, but it seems to render it more fluid and not to increase the solids. It might be tried in gall-stones.

The salicylates have been recommended in diphtheria, probably in consequence of the antiseptic power of the acid, but it is of most use as a local application.

Two cases of diabetes are reported by Ebstein and J. Müller as having recovered under salicylate of soda, after the failure of carbolic acid and many other remedies.

Salicylic acid has been given internally in vesical catarrh, in phosphatic deposits, in alkaline urine, and in gonorrhœa, &c., chiefly with a view to its disinfectant properties; but we have seen that only a small portion is excreted as acid. Moreover, salicylous acid and some other products are local irritants like the acid itself. Large doses of the acid are apt to bring on albuminuria, and acute nephritis has followed a few doses. Hæmaturia, with casts in the urine, has sometimes appeared after 3 or 4 moderate doses of the acid. Obviously, therefore, wherever renal disease is present, it is not a safe remedy. The disinfectant action in the urethra, and even bladder, could, if desirable, be obtained by injections.

Elimination of the salicyls is chiefly by the kidneys, though a small portion passes away in the sweat, saliva, bile, and mucous secretions. Soon after taking a dose it may be detected in the urine, and elimination continues for 24 to 48 hours or more. But at first the removal is very rapid, so

that, although some remains in the system a long time, the amount is speedily reduced. Hence the call for frequent doses. Moreover, the use of single massive doses, such as are given of quinine for its antipyretic effect, is not desirable.

Dose and administration.—Salicylic acid, if given internally (5 to 30 grains), may be dissolved in glycerine and water, or it may be taken in wafer paper, and water freely drunk after it. Salicylate of sodium is very soluble, and its sweetish taste is not objected to by some—10 to 30 grains is the official dose—the average prescription perhaps being 15 grains every 2 hours in acute rheumatism. Of salicin larger doses than the official (3 to 20) are required for this purpose. I should say 20 to 30 grains every 2 hours until the effect is produced. This quantity can be stirred up in water; it is bitter, and if this be objected to, can be taken in wafer paper.

CHANGES IN THE INORGANIC PREPARATIONS.

Some additions to, and numerous alterations in, preparations derived from the metalloids and metals have been made.

BROMUM.

SODII BROMIDUM, NaBr, is now made official, and obtained as the potassic salt, but replacing the solution of potash with that of soda in the process, and crystallising from warm solutions.

Characters and Tests.—A granular white powder consisting of small monoclinic crystals, somewhat deliquescent, inodorous, with a saline taste, readily soluble in less than twice its weight of water, much less soluble in spirit. When its aqueous solution is mixed with a little chlorine water, and shaken with chloroform, the latter, on falling to the bottom of the fluid, exhibits a red colour. Ten grains of the dry salt requires for complete decomposition about 960 grain-measures of the volumetric solution of nitrate of silver. Does not strike blue with starch and an aqueous solution of chlorine or of bromine.

Bromide of Sodium contains weight for weight more bromine; and should, therefore, be rather more powerful, and is more easily tolerated. (Compare remarks on iodide, and note.)

Official dose.—10 to 30 grains.

SULPHUR

has been introduced into the compound liquorice powder from which it was previously omitted. This is a good thing, as the old powder was intended as a substitute for the German formula, and without sulphur, the chief ingredient, was quite a different article—the play without Hamlet.

PULVIS GLYCYRRHIZÆ COMPOSITUS is now made by mixing the following ingredients, in fine powder:—Senna, 2 parts; liquorice, 2; fennel fruit, 1; sublimed sulphur, 1; refined sugar, 6.

Dose.—30 to 60 grains.

IODUM.

ODOFORM has already been considered with carbon compounds; *Liq. Iodi*, on p. 2; the liniments on p. 5.

TINCT. IODI.—The amount of iodide of potassium is now doubled.

SODII IODIDUM, *NaI*, is now admitted to the B. P. It may be obtained by the same process as the potassium iodide, using solution of soda instead of potash.

Iodide of sodium has been freely used for some years in place of the iodide of potassium. It contains, as the result of the difference of the atomic weights, more iodine, but is given in about the same dose. It is more easily tolerated, probably because the base is not so depressant as potassium, which is also the reason why the ammonium salt was first employed. The ammonium and potassium salts are decomposed in the stomach and absorbed as a sodium salt in combination with albuminate.*

PHOSPHORUS.

There is change and increase of strength in this class, but neither of the preparations affected are likely to give satisfaction.

OLEUM PHOSPHORATUM.—Oil of almonds is now to be the solvent, and 16 grains of P. used in the place of the 12 formerly employed. The result is that the new oil contains about 1 per cent. in place of 0.75. It is to be hoped this considerable increase will not be forgotten by prescribers. It is a clear straw-coloured oil and luminous in the dark. Oil is one of the oldest vehicles tried, but at best is a nauseous preparation and not much used.

Off. Dose.—5 to 10 minims. See p. 2.

PILULA PHOSPHORI.—The unsatisfactory process for making this pill—which has been known to pass unchanged through the system—is retained, except that 3 grs. of phosphorus take the place of 2, and eventually 90 grains of curd soap are called

* The author has for many years taught the advantages of sodium over potassium salts, as well as the use of calcium salts. (*Med. Soc. Lond.*, 1871.)

into requisition in this wise :—When dispensed, every 2 grains of the new mass, which is thus one-third stronger, is reduced by the addition of one grain of curd soap, a little spirit being used to soften the whole. The pill mass complete will thus contain $\frac{1}{3}$ gr. in 3 grs. The profession will have anticipated a better result than this appears to be, and complaints of the new pill may be looked for as soon as time permits a trial. Why not have gone once more to the U. S. P., which has afforded so much help? The official dose is 2 to 4 grs., but probably this form will soon be obsolete.

SODIUM.

The metal is now entered in the B. P. as it is required in the metallic state to make liq. sodii ethylatis; but potassium, although so many of its salts are official, is itself not admitted—as not being used except in combination. All salts are now referred to the metal, not the oxide, in accordance with modern chemical teaching, which considers them as formed by the substitution of the H in an acid by a metal. Students will therefore find their pharmaceutical and chemical names correspond, and older men will learn to write sodium and sodii where they have been accustomed to write soda and sodæ, when salts are concerned; but liq. sodæ and liq. sodæ efferves. remain, and liq. sodæ chloratæ returns to its former name, liq. sodæ chlorinatæ; while soda caustica and soda tartarata remain unchanged.

Acetate of soda is, by error, said to be omitted. See p. 112. The new salts admitted are sodii bromidum, described under bromum; sodii iodidum, under iodum; sodii sulphis, under acidum sulphurosum; sodii sulpho-carbolas, in connection with carbolic acid; sodii salicylas, with the salicyls.

SODII CITRO-TARTRAS EFFERVESCENS.—In this preparation the 8oz. of tartaric acid is increased to 9oz., and 5oz. of refined powdered sugar is added. These changes make it more like the so-called effervescing citrate of magnesia.

POTASSIUM.

Changes of nomenclature are made corresponding with sodium. Potash has its translation potassa, and we have therefore liq. potassæ and liq. potassæ efferv., as well as

potassa sulphurata—a mixed substance—but all the true salts are referred to the metal.

POTASSII CYANIDUM is the only additional salt. It is used for the preparation of Bismuthum Purificatum. It is obtained by heating ferrocyanide until gas ceases to come off, and after subsidence of sediment, decanting the clear fluid. It is in white, opaque, deliquescent, crystalline masses, with an odour of prussic acid. It is soluble, with an alkaline reaction. Intensely poisonous.

AMMONIUM.

Nomenclature is changed by referring all true salts to the metal, but the two solutions retain their name of ammonia, as consequently does linimentum ammoniæ. Two new preparations are introduced, viz., strong solutions of citrate and acetate of ammonium, by dilution of which the other two solutions are then made.

SP. AMMON. AROMAT.—The carbonate of ammonia is reduced by half, but the liq. ammon. fort. is doubled; an additional half drachm of each essential oil is ordered, and the product is to be made up to a gallon instead of 7 pints. Only the essential oils and spirits are to be distilled, the ammonias being added afterwards. The sp. gr. is given 0.886, but it is nearer .899. Is it a misprint for 896?

LIQUOR AMMONII ACETATIS FORTIOR.—Strong Solution of Acetate of Ammonium.

(*Prep.*—Carbonate of ammonium, $17\frac{1}{2}$ ounces; acetic acid, 50 fluid ounces, or a sufficiency; distilled water, a sufficiency. Crush the carbonate of ammonium; add it gradually to about 45 ounces of the acetic acid; then add more of the acid until a neutral liquid results; lastly add sufficient distilled water to yield three pints of product. The solution should be stored in bottles free from lead.)

Characters.—A little of the solution, heated in a test-tube to expel carbonic acid, should be neutral to test-papers. Specific gravity 1.073.

Dose.—25 to 75 minims.

In making this stronger solution it will be found that the “sufficient distilled water” must be more than dispensed with, for the bulk of the product will exceed the limit of 3 pints before the sufficient water is called upon. The solu-

tion therefore cannot quite correspond with the intention of the formula. It is curious that the strong solution in common use for many years, made with caustic ammonia, should not have been adopted. It seems useless to cumber the B. P. with two solutions of salts in this fashion, when it would be easy once for all to arrange a strength which would keep well, and be convenient. It would at any rate have been as safe to strengthen such saline solutions as the potent preparations of arsenic or of morphine.

LIQUOR AMMONII CITRATIS FORTIOR.—Strong Solution of Citrate of Ammonium.

(Citric acid, 12 ounces ; strong solution of ammonia, 11 fluid ounces, or a sufficiency ; distilled water, a sufficiency. Neutralise the acid with the ammonia, adding sufficient distilled water to make one pint.) Store in bottles free from lead.

Characters.—Neutral to test-papers. Specific gravity is given as 1·209, but it is nearer 1·245.

Dose.— $\frac{1}{2}$ to 1 $\frac{1}{2}$ fluid drachms.

This solution also is too strong, as some of the salt soon begins to crystallize out. It must therefore be somewhat reduced to give a stable solution.

Liquor ammonii acetatis is made by mixing 1 part of the stronger solution with 5 of water. Sp. gr. 1·022.

Dose.—2 to 6 fl. drachms.

Liquor ammonii citratis, by diluting 1 fluid part of the stronger with 4 of water. Sp. gr. 1·062.

Dose.—2 to 6 fl. drachms.

CALCIUM.

True salts are named from the metal, calcium. But calx, as good Latin for lime, remains, and, of course, Liq. calcis and Liq. calcis sacch. Calx chlorata again becomes chlorinata, and calx sulphurata, now introduced, takes that name because it is only a mixture—not a true salt. The two solutions of chloride of calcium are left out of the appendix, and the saturated one is inserted in the body of the B.P.

CALCII SULPHAS is native sulphate, $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$, rendered nearly anhydrous by heat, and is only introduced for the purpose of making

CALX SULPHURATA, a mixture which should contain not less than 50 per cent. of calcium sulphide CaS . It is made by heating 7 of the sulphate with 1 of finely powdered wood charcoal till all black colour has disappeared. It is whitish, with an odour of H_2S .

The most powerful of the sulphurated mineral waters contain sulphides, and the calcium salt has lately been used in almost as many maladies. Enlarged glands, scrofulous sores, boils, carbuncles, and other diseases have been said to vanish before a few doses of calcium sulphide, which has also been credited with the power of promoting pus laudabile, but better still to prevent suppuration when given early, and if too late for that, to hasten the ripening process. Surgeons can put aside their lancets and give coated pills of calcium sulphide! Boils and carbuncles are said to give way before frequent pilules ($\frac{1}{15}$ gr. ea.), indurations disappear, chronic abscesses heal, and even diseased bone bows to the benign influence.

Official dose.— $\frac{1}{15}$ to 1 grain.

LIQUOR CALCIS.—The lime is to be washed until free from chlorides. The test is reduced to 5 grains of CaO per 10 fl. oz.

LIQUOR CALCII CHLORIDI is made by dissolving 1 part of the salt in 5 of water, and filtering if necessary. Sp. gr. 1.145. This salt was formerly a good deal used in glandular swellings, chronic skin diseases, and scrofula. It was believed to stimulate the lymphatic glandular system. The late Dr. Begbie, of Edinburgh, had considerable confidence in its powers, and more recently it has again been coming into favour.

The weaker solution was generally used in 20 to 30 minim doses, gradually increasing to 50 or 60. The new liquor is 1 in 5, twice the strength, but the official dose is put at 15 to 50 minims. It would be better to begin at the lowest point, and increase by degrees. Milk is a good vehicle, or it can be taken in plain water.

ARSENICAL PREPARATIONS.

The metal is henceforth to be called arsenium, and the word arsenic will only be recognised as a synonym of arsenious acid. The two solutions retain their names, but their strength has been *increased* from 1 in 109 to 1 in 100,

a very appreciable increase of so potent an agent—though the official dose has been allowed to remain the same—2 to 8 minims. Two new preparations—the iodide and Donovan's solution—are introduced.

ARSENII IODIDUM, iodide of arsenium, AsI_3 , obtained by the direct combination of metallic arsenium with iodine, or by evaporating an aqueous solution of arsenious and hydriodic acids. Orange coloured, soluble crystals, neutral reaction. It is used as an arsenical remedy. The official dose $\frac{1}{30}$ grain—much more is commonly given on the Continent, where it has been most used. It is introduced chiefly to make the next preparation, which contains about 1 per cent.

LIQUOR ARSENII ET HYDRARGYRI IODIDI.—Solution of Iodide of Arsenium and Mercury, or Donovan's Solution—The original Donovan's solution contained nearly 42 grains of each iodide in 10 fluid ounces.

(Iodide of Arsenium, Red Iodide of Mercury, each 45 grains; Distilled Water, a sufficiency. Triturate the iodides with about an ounce and a half of distilled water until nearly all is dissolved. Pass through a filter, and wash the latter with sufficient water to produce ten fluid ounces of solution.)

Characters and Tests.—A clear pale yellow with a metallic flavour. Specific gravity 1.016. Sulphuretted hydrogen throws down a precipitate partially insoluble in strong nitric acid; while the dissolved part, when diluted, yields a yellow precipitate on the gradual addition of solution of sulphhydrate of ammonium. One fluid ounce contains about one-hundredth of a molecular weight in grains (about 1 per cent. by weight) of arsenious iodide, AsI_3 , and of mercuric iodide, HgI_2 .

Dose.—10 to 30 minims.

This solution was a long established favourite in Dublin, and was in the old Dublin Pharmacopœia. In skin diseases, especially the scaly kind, in lupus and other serious diseases, as well as in syphilitic cases, it was largely used. The original intention was to combine the three potent remedies—arsenic, mercury, and iodine. The late Dr. Neligan, who used it much in cutaneous affections, found that it sometimes gave rise to injurious effects, which he attributed to the mercury; and he, therefore, had a solution made in which that ingredient was omitted, and iodide of potassium added.

ANTIMONIUM.

Black antimony is in future to be purified by fusion, reduced to fine powder, and if on testing any soluble salt of arsenium should be present, it is to be macerated with ammonia for five days, frequently stirring, and after subsidence well washed and dried. The name of the substance is to be antimonium nigrum purificatum. This purer article is to be used for the preparation of sulphurated antimony, and the process is modified by adding an equal quantity of sulphur to the soda and antimony before boiling. The product answers to the same description and tests.

Dose.—1 to 5 grains, but scarcely ever given except in Plummer's pill.

ALUMEN.

The new B. P. recognises potassium alum as well as the ammonium alum. It directs potassium alum $\text{Al}_2\text{SO}_4, \text{K}_2\text{SO}_4$, to be used in making dried alum, but gives no direction which to use in the glycerine.

Official dose of alum, 10 to 20 grains.

GLYCERINUM ALUMINIS.—(By dissolving 1 oz. alum in 5 oz. of glycerine by the aid of a gentle heat, then setting aside and pouring off the clear fluid from any deposit.) It is estimated that the preparation will contain 1 part in $7\frac{1}{2}$. It will no doubt for a time be freely prescribed instead of some other astringent for local use.

CUPRUM.

The only alteration is the addition of the corrosive nitrate, which has been used from time to time as a caustic, but with which surely it was unnecessary to burden the B. P. However, here it is, with its deep blue prismatic crystals staring at the student, who should remember it is very deliquescent as well as corrosive.

CUPRI NITRAS.—Nitrate of copper, cupric nitrate, $\text{Cu}(\text{NO}_3)_2, 3\text{H}_2\text{O}$, may be made by dissolving copper wire in diluted nitric acid, evaporating and crystallising. Highly corrosive, very deliquescent, absorbs water enough from the

air to become a potent fluid caustic. Has been employed chiefly in phagedæna, lupus, and syphilitic ulceration.

BISMUTHUM.

A new method of purifying is given, by heating the metal with cyanide of potassium and sulphur instead of with nitrate of potassium. It is afterwards heated with about 5 per cent. of the carbonates of potassium and sodium, in equal proportions. Two new preparations are added, the citrate and the double citrate of bismuth and ammonium.

BISMUTHI CITRAS.—CITRATE OF BISMUTH.— $\text{Bi C}_6\text{H}_5\text{O}_7$.—This now is prepared as follows:—Subnitrate of Bismuth, $5\frac{1}{2}$ ounces; Nitric Acid, 11 fluid ounces, or a sufficiency; Citric Acid, 4 ounces; Bicarbonate of Sodium, 8 ounces; Distilled Water, a sufficiency.

Heat the subnitrate of bismuth with the nitric acid until the salt is dissolved. Pour in some water, with constant stirring, until the cloudiness produced by the water no longer rapidly disappears. Dissolve the bicarbonate of sodium in distilled water, add the citric acid, boil until all gas is expelled, and then add the liquid to the clear or only faintly opalescent solution of bismuth until no further precipitate is produced. Heat to boiling, occasionally stirring. Set the whole aside to cool. When cold, filter, and wash the precipitate of citrate of bismuth until no free nitric acid remains. Dry the product over a water-bath.

Characters and Tests.—A white powder usually containing two and a half per cent. of absorbed moisture; soluble in solution of ammonia to a clear or nearly clear liquid. The latter solution yields a black precipitate with sulphuretted hydrogen, and the filtrate from this precipitate, after it has been boiled until free from ammonia, and then filtered, gives a white precipitate when warmed with lime water; the filtrate also affords no black colour round a crystal of sulphate of iron added together with an equal bulk of sulphuric acid. This shows absence of nitrate. On strongly heating citrate of bismuth it chars, and on ignition yields a residue for the most part black but with a yellow surface, soluble in a little nitric acid.

LIQUOR BISMUTHI ET AMMONII CITRATIS.—This solution is now directed to be made by rubbing up 800 grains of the

new official citrate with enough water to form a paste, adding ammonia solution gradually until just dissolved, and diluting with distilled water to a pint. This gives a clear solution of sp. gr. 1.07 neutral or feebly alkaline, freely miscible with water. One fluid drachm contains about the equivalent of 3 grains of *oxide* of bismuth.

Dose.— $\frac{1}{2}$ to 1 fluid drachm.

BISMUTHI ET AMMONII CITRAS.—By evaporating the liquor just described, and drying, in thin layers, at a temperature not above 100° F., pretty translucent scales, freely soluble, may be obtained. They constitute the present article, and will, perhaps, supplant some of the solutions in vogue.

Dose.—2 to 5 grains.

FERRUM.

Three new preparations are included, viz., two solutions of the acetate and a solution of dialysed iron. To balance the scales three articles are omitted, viz.:—Iodide (but the syrup and the pill both remain), magnetic oxide, and moist peroxide. Some may think the latter should have been left, it being used as an antidote, but the dried product is still official, and the process is described in full. As the antidote has to be freshly made, it is only necessary to remember that the article is the same as the other peroxide, but undried.

TINCT. FERRI PERCHLOR.—Now made with 5 of stronger solution, 5 of rectified spirit, and 10 of water—same strength as before.

LIQ. FERRI ACETATIS FORTIOR.—From solution of persulphate, ferric hydrate is precipitated by ammonia, washed carefully, drained and then dissolved in glacial acetic acid, and water added to bring it to the proper strength. Sp. gr. 1.127. The liquid is deep red, smells like vinegar, and tastes sour and astringent, but makes a more agreeable mixture than the perchloride.

Dose is put at 1 to 8 minims, but the weaker solution or tincture will be mostly used.

LIQ. FERRI ACETATIS (by diluting 5 oz. of the strong solution with water to make exactly 20 oz.).—This is the same strength as Tincture, and may generally be preferred.

TINCTURA FERRI ACETATIS.—Mix strong solution, 5 oz.; acetic acid, 1; rectified spirit, 5; water enough to make up 1 pint. Of the same strength as the last solution, and may be given in the same doses; 5 to 30 minims twice or three times a day, properly diluted.

It seems useless to have such a variety of preparations so nearly alike. The solutions keep better than tinctures, and the latter at least could be spared. In fact, if the stronger liquor is to be given internally as indicated by the dose stated, we could very well do with that alone and dilute as required. Such a simplification would be a boon to students, to busy practitioners, and no doubt to pharmacists.

FERRI PHOSPHAS.—Bicarbonate of sodium is now used instead of acetate, to avoid waste of the phosphate.

SYRUPUS FERRI PHOSPHATIS.—Bicarbonate of sodium 56 grains, to take the place of the 74 of acetate formerly employed; concentrated phosphoric acid $1\frac{1}{4}$ fluid oz., to replace the $5\frac{1}{2}$ oz. of dilute acid. This syrup will be much more acid than the former one, as the amount of concentrated acid = $8\frac{1}{3}$ fluid oz., instead of the $5\frac{1}{2}$ of dilute acid. In consequence of the use of bicarbonate of sodium the proper amount of phosphate will be contained in this syrup, viz., 1 grain of anhydrous phosphate, $\text{Fe}_3(\text{PO}_4)_2$, in each fluid drachm. The increased acidity makes it desirable to dilute more freely when taking.

LIQUOR FERRI DIALYSATUS.—Solution of dialysed iron, is defined as a solution of highly basic ferric oxychloride, or chloroxide of iron, from which most of the acidulous matter has been removed by dialysis.

Prep.—Mix 6 oz. of the strong solution of perchloride of iron with 2 pints of distilled water, and stir in sufficient diluted solution of ammonia to impart, after thorough agitation, a distinct ammoniacal odour. Filter through calico, wash the precipitated ferric hydrate with distilled water, and then squeeze it to remove superfluous moisture. Add the precipitate to 1 oz. solution of perchloride of iron, stir thoroughly, warm gently, and when complete or nearly complete solution is obtained filter if necessary and dialyse. The resulting solution should measure twenty-eight fluid ounces.

Characters and Tests.—A clear dark reddish-brown liquid, free from any marked ferruginous taste. Neutral to test-papers. Specific gravity about 1·407? says B. P., evidently a misprint for 1·047. The solution gives no precipitate with ferrocyanide of potassium or with nitrate of silver, but after being heated with hydrochloric acid it yields with ferrocyanide of potassium a blue precipitate. 100 grains by weight afford a precipitate with a solution of ammonia, which, washed, dried, and ignited, weighs five grains.

The process above given depends on the results obtained by the late Professor Graham in his researches on the diffusion of liquids. In 1861, Graham stated, in the course of a communication to the Royal Society, that "If recently precipitated ferric hydrate or carbonate of ammonium is added to an aqueous solution of ferric chloride, as long as the precipitates are redissolved, and if the dark-red solution thus obtained, containing from 4 to 5 per cent. of solid matter, is subjected to dialysis, mainly muriatic acid will pass through the septum, upon which, after nineteen days, remains a red liquid, containing, for 98·5 parts of oxide, 1·5 part of muriatic acid." The liquid obtained by dialysis differs much from an ordinary solution of salts of iron, from which it may be distinguished by its not giving rise to the blood-red colour on the addition of an alkaline sulpho-cyanide, nor to the blue precipitate with ferro-cyanide of potassium. Neither does it become cloudy on boiling. Agitated with two parts of ether and one of alcohol, the ether layer is not coloured yellow. We may add that the iron is at once precipitated by sulphuric acid, by alkalies, and by many salts. So sensitive is the liquid that ordinary spring-water will cause a precipitate. But no precipitate is produced by nitric, acetic, or muriatic acids; from which Bequerel concludes that it will not be affected by the chlorides of the alimentary canal. Graham's solution gelatinised in about twenty days, and he regarded it as a solution of colloidal ferric hydrate, which he considered existed in both a soluble and an insoluble form. This hydrate has, however, never been obtained absolutely free from chlorine—the presence of which perhaps maintains in solution oxychloride of iron. In that case a very little more chlorine would suffice to render the solution permanent. Yet although, theoretically, we may regard the liquid as a solution of a basic oxychloride, we must not forget that it differs essentially from solutions prepared by saturation of the

hydrate, all of which have an acid reaction, and an astringent, ferruginous taste.

Use.—Dialysed iron may be given when astringency is objectionable, and even when small doses of the vegetable salts or of reduced iron are not well tolerated. It seldom interferes with the digestive organs, and it is not necessary to precede its use by the time-honoured aperient, nor to repeat that dose at more or less frequent intervals. The iron is readily absorbed and produces the hæmatinic effects of the remedy, which may be measured by counting the blood-corpuscles; and Dr. Amory has succeeded in projecting upon a screen a magnified image of the slide employed in this method. In five cases of anæmia with diminished corpuscles, as determined by the hæmacytometer, the globules rapidly increased under the use of ninety drops daily, and general improvement went on *pari passu* with this increase.

The official dose of dialysed iron is from 10 to 30 minims. This can be given three times a day. Dr. Weir Mitchell gives a drachm of the solution at a time, and finds that such doses neither “constipate nor affect injuriously the process of digestion.” The dose may be taken in a little water or on a lump of sugar. Professor Da Costa has used it hypodermically with great benefit, beginning with fifteen minims, and soon increasing to thirty. No inconvenience, local or general, was produced, and he suggests this method of administration in gastric ulcer, pernicious anæmia, and when, from defective absorption or assimilation, it seems desirable to introduce the remedy directly into the system.

Dr. T. B. Reed recorded* a case of poisoning by arsenic in which he had resorted to dialysed iron; and quite a number of cases have since been published. The solution has the advantage of being ready when wanted, but it is said the resulting combination parts with arsenic more readily than will the older antidote, with which, therefore, it might be well to follow. But dialysed iron might be used when materials to make the moist peroxide are not at hand, or even while preparing it.

Solutions prepared by saturation have been substituted for the product of dialysis; some specimens have found their way into the market, which were not only innocent of any

* *Philadelphia Medical Times* for December 8, 1877.

acquaintance with the dialysing membrane, but seemed little else than diluted solution of perchloride. Such frauds are easily detected by test-paper or by the taste. The product of careful dialysis is quite neutral in reaction, has no astringency, and answers to the chemical characteristics stated above.

HYDRARGYRUM.

There is not much alteration in regard to this metal. Practitioners who have survived two or three Pharmacopœias will be glad to find no more tampering with the nomenclature of calomel and corrosive sublimate. The sulphate from which they are prepared is henceforth to be called Hydrargyri persulphas. Oleate of mercury is introduced under the name Oleatum Hydrargyri, and there is a dilute citrine ointment. For internal use the well-known Donovan's solution, but a little stronger, is introduced. It is described among arsenical preparations (p. 43). The green iodide is now omitted, the more potent red salt being retained as the only iodide, HgI_2 , with the old name Hydrargyri Iodidum Rubrum. This enters into Donovan's solution—Liquor Arsenii et Hydrargyri Iodidi. The strength of Ung. Hydrarg. Ammoniatum is now reduced to 10 per cent., being made with 1 part of the precipitate and 9 of simple ointment. It was about 15 per cent.

OLEATUM HYDRARGYRI. Oleate of Mercury.—Yellow Oxide of Mercury, 1 oz. or 1 part; Oleic Acid, 9 ozs. or 9 parts. To the oleic acid kept stirred in a mortar add gradually the oxide of mercury, and triturate occasionally until it is all dissolved.

Characters.—A light-brown, oleaginous, semi-solid substance composed of oleate of mercury and oleic acid, and having the usual slight smell of oleic acid. Gently warmed, no black precipitate separates. Heated with a piece of copper foil, the latter becomes coated with a film of metallic mercury.

This oleate may be prepared with half the above proportion of oleic acid, the remainder being added just before, or not long before, the oleate is dispensed.

This is the oleate in common use since Mr. Marshall introduced it. It is easily absorbed, and may be used to produce all the local and general effects of mercury. Small

quantities are applied with advantage to inflamed joints, enlarged glands, various indurations, &c.; also in eczema, psoriasis, tinea, sty, and sycosis. It should not be rubbed in like ointments and liniments, but simply applied with a brush or the finger. For use to painful joints, &c., morphine may be added—8 grains of the pure alkaloid to 1 oz. of the oleate. The salts of morphine do not dissolve in oleic acid.

UNG. HYDRARG. NITRATIS DIL. is made by mixing 1 part of the unguentum with 2 of soft paraffin.

This is a convenient addition to our formulæ, as citrine ointment was constantly used diluted. When applied pure it irritates, and as it was so much used in ophthalmic cases this was important. It is doubtful if the addition will suit such cases—the special hospitals using it much more diluted still (1 to 8, 10 or 12). The new ointment will suit for certain skin affections requiring a strong stimulant, and, considering all, it would have been better, perhaps, to reduce the strength of an ointment—scarcely ever ordered pure—rather than encumber the pharmacopœia with two formulæ.

ARGENTUM.

Two new preparations of the nitrate are introduced, although one of them, toughened caustic, is concealed in an incidental observation appended to nitrate. The other is a much milder application.

TOUGHENED NITRATE OF SILVER, or “toughened caustic,” alluded to above, and for which no Latin name is given, is made by adding 5 per cent. of nitrate of potassium before fusing. Of course, it is intended to be run into moulds to furnish the familiar rods. This is one of the modes in which manufacturers have been in the habit of meeting a demand for a less brittle “stick” than is furnished by pure silver nitrate run into moulds. The U. S. P. has a moulded caustic, obtained by fusing with a small quantity of HCl, and calls it “Argenti Nitras Fusus.” Perhaps the same name might be adopted if a Latin synonym for toughened caustic should be wanted.

ARGENTI ET POTASSII NITRAS.—This is much weaker, and as a synonym “mitigated caustic” is offered. It is made by

fusing in a platinum capsule silver nitrate with *twice its weight* of potassium nitrate, and pouring into moulds. It is therefore greatly reduced in strength. A preparation of equal parts of the two salts has been in use, and was admitted into the U. S. P. under the name Argenti Nitras Dilutus, whence the B. P. have taken it, but altering the strength. So we get another similar article. Let us hope the "mitigated caustic" may be found strong enough for surgeons, or the multiplication of formulæ will be pronounced an unmitigated nuisance by them as well as by students. The colour of the sticks is greyish-white; they are freely soluble in water, sparingly in spirit. 30 grains precipitated by H Cl, and well washed and dried, should yield 8.44 grains.

Argenti et potassii nitras is only intended for local application, and it acts less energetically than the familiar sticks of fused nitrate of silver.

PLUMBUM.

Several formulæ for utilising glycerine as a vehicle for the local application of lead have been in use, since Mr. B. Squire introduced one in 1876 for chronic eczema. We now have an official glycerine, and from that an ointment.

GLYCERINUM PLUMBI SUBACETATIS is made by melting together and boiling for $\frac{1}{4}$ hour: acetate of lead, 5 oz.; oxide of lead, $3\frac{1}{2}$ oz.; glycerine, 1 pint; water, 12 f. oz.; then filtering the product and dissipating the water by evaporation.

Unguentum Glycerini Plumbi Subacetatis (of the above glycerine of lead, 1 part; soft paraffin, 4; and paraffin, 1 oz. Melt the paraffins together, add the glycerine, and stir till cold) may be used in all cases in which the several lead ointments have been found so useful. It is considered by some dermatologists as even more valuable, and it keeps much better.

ZINCUM.

Calamine is again restored to the glories of official existence, and four other additional preparations of zinc are introduced.

ZINCI SULPHOCARBOLAS, Sulphocarbolate of Zinc, $\text{Zn}(\text{C}_6\text{H}_5\text{SO}_4)_2, \text{H}_2\text{O}$. May be obtained by heating a mixture of carbolic acid and sulphuric acid, saturating the product with oxide of zinc, evaporating and crystallising.

Characters and Tests.—Colourless, transparent, tabular, efflorescent crystals; soluble in about twice their weight of rectified spirit or of water. The aqueous solution is coloured violet by perchloride of iron, and affords a white precipitate with sulphhydrate of iron, and affords a white precipitate with sulphhydrate of ammonium; it is not at once rendered turbid, or is only rendered faintly turbid, by chloride of barium, and is not precipitated by oxalate of ammonium.

This salt has won its way as a useful astringent. It is sometimes supposed to be antiseptic, on account of the carbolic acid it contains; but this is not so readily set free on contact with the tissues, and it is only used topically. Still, whatever change it might undergo, would be in favour of making it antiseptic. It may be used as sulphate or acetate of zinc.

OLEATUM ZINCI.—By dissolving zinc oxide, 1 part in oleic acid 9, with the aid of heat.

UNGUENTUM ZINCI OLEATI (by mixing the above oleate and soft paraffin in equal parts, with a gentle heat and stirring until cold).

The use of the new oleates has been stated under oleic acid. The effect of the zinc base will be the same as when using the older ointments. Prepared in this way, the oleate will be irritant, and the ointment may not be tolerated in some skin affections. The more recently introduced oleates, mixed with lard, will probably supersede these formulæ.

CALAMINA PRÆPARATA.—Calamine, an impure carbonate of zinc, was at one time largely employed as a local application; but fell into disuse on account of its impurities—not to say falsification, for some samples were mere imitations of calamine. It was supposed that the introduction of a pure carbonate of zinc would supply a definite article, which would replace with advantage the impure one. But this has not been the result. Calamine is found native in a tolerably pure state, in lumps of an earthy appearance, but sometimes it occurs in crystallised masses. Heated to redness, powdered

and levigated, it gives us a very fine pale pinkish-brown powder, which can be sprinkled over excoriations or sores, or used in the form of ointment. It was omitted in the first B. P., though it was in the P. L. and P. E. The powder may be used to dust the skin of infants instead of the starches. It does not become decomposed when wetted by the infant's secretions, and is a good, rather soothing absorbent. It is applied in the same way to sore nipples, and was once freely used to the surface of large ulcers, with the intention of absorbing the pus, and causing the granulations to contract. Pure carbonate of zinc is retained in the B. P., but the ointment is made from the oxide, and is more astringent, which may be the reason that calamine has retained its popularity.

UNGUENTUM CALAMINÆ (by mixing prepared calamine, 1; with benzoated lard, 5).—This is a restoration of the old Turner's cerate, once so much in vogue, and represented in the ceratum calaminæ of P. L. and P. E.

CHANGES IN ORGANIC PREPARATIONS.

The additions to the vegetable substances as well as the other changes are more numerous than those in the preceding section. We will take first, as forming a convenient group, the three new essential oils, the two stearoptenes, and the oleo-resin which have been introduced. Next we will consider the new important plants, their preparations and active principles, and afterwards the new preparations of formerly official organic substances.

OLEUM EUCALYPTI.—OIL OF EUCALYPTUS.

The oil distilled from the fresh leaves of *Eucalyptus Globulus*, *Labill.*; *Bentl. and Trim. Med. Pl.* vol. ii. plate 109; *Eucalyptus amygdalina*, *Labill.*; and probably other species of *Eucalyptus*.

Characters and Tests.—Colourless, or pale straw-coloured, becoming darker and thicker by exposure. It has an aromatic odour, and a spicy and pungent flavour, leaving a sensation of coldness in the mouth. It is neutral to litmus paper. Specific gravity about 0.900. Soluble in about an equal weight of alcohol.

Dose.—1 to 4 minims.

Eucalyptus globulus, the Australian blue gum tree, has been held to have powerful anti-malarial and anti-pyretic properties, and swampy districts have been planted with this "fever-tree" in the belief that it renders them more wholesome. This it probably does by the large amount of moisture it takes from the soil. Some have ranked it next to quinine in agues, but others have found it of little use. The difference is probably due to the modes of use. The active medicinal agent is the oil. Tinctures and infusions from the *fresh* leaves might therefore be active, while those prepared from dry leaves (especially if carelessly dried) might be inert. The oil therefore is best even for internal use, but to some persons its flavour is peculiarly disagreeable.

The oil is a powerful antiseptic and disinfectant, and as it is so much less irritant and poisonous than carbolic acid it has largely replaced that in surgery. Not only does it render the discharge pure as it comes in contact with the dressing,

but its great volatility keeps the part continually bathed with antiseptic vapour. This very volatility, however, tends to prevent the gauze from keeping well, and some surgeons therefore consider carbolic gauze safer, though they use eucalyptus for other antiseptic purposes.

Internally.—Small doses produce a degree of excitation and nervousness or restlessness, usually followed by a feeling of repose often ending in sleep. There is sometimes nausea and loss of appetite, probably to a great extent from disgust with the flavour. Occasionally there is disturbed action of the bowels. In larger quantities there is no excitement—general depression comes on from the first. Temperature, pulse and respiration fall: drowsiness, feeble respiration and lowered blood pressure, muscular feebleness deepening into paralysis ensue, and the nerve centres are gradually depressed until death occurs from respiratory failure. *Elimination* by both lungs and kidneys, imparting its own odour to the breath, and to the urine a perfume compared to violets, as does turpentine. It disinfects the secretions, at the same time stimulating the mucous surfaces: it has therefore been freely used in cystitis and pyelitis on the one hand, and on the other in bronchitis, dilated bronchi and other affections where the sputum is abundant. In these latter it is often used as an inhalation, as also in ozæna, the fœtor of which it corrects. In asthma cigarettes made of the dried leaves have been used, but the inhalation of vapour is less uncertain. After parturition and in uterine catarrh injections and pessaries have been employed. Combined with iodoform to form bougies it is employed in urethritis. Hypodermic injections have been recommended in pyæmia and septicæmia.

UNGUENTUM EUCALYPTI (Oil 1, Hard and Soft Paraffin of each 2 = 1 in 5).—This gives a strength of 1 in 5. It should be kept well covered and in a cool place. Best freshly made.

OLEUM PINI SYLVESTRIS.—FIR-WOOL OIL.

The oil distilled from the fresh leaves of *Pinus sylvestris*, Linn.; *Lamb. Gen. Pin.* plate 1.

Characters and Tests.—Colourless or nearly so, with an aromatic lavender-like odour and a pungent but not unpleasant flavour. Specific gravity not below 0.870. Soluble in about seven times its volume of rectified spirit.

Preparation.—Vapor Olei Pini Sylvestris.

This oil has been for years in use and is of a more agreeable odour than common turpentine. A fibrous material from several pines is made into a kind of wadding and wool and utilised for clothing. Hence the name of fir-wool oil. To these fabrics a certain value has been attributed in rheumatism. It is doubtful whether the oil supplied has really been chiefly from *Pinus sylvestris*, which is one of the plants yielding *oleum terebinthinæ*, and no doubt the *leaves* of the others will yield a similar product. It will be understood, however, that the oil distilled from the fresh leaves is intended, while *oleum terebinthinæ* is obtained from the oleo-resin (turpentine). Would not *ol. pini fol.* have been a more distinctive name?

This oil has a milder but more aromatic odour and flavour than *ol. terebinth.* for which it may be generally substituted as a less disagreeable remedy both for external and internal (not as an antidote in phosphorus poisoning) use, especially in respiratory diseases. Like the aromatic oils, camphors and balsams, the terebinthinates have been too much neglected, as shown elsewhere.—(Author's "Respiratory Therapeutics," chap. xviii.)

It is introduced into the Pharmacopœia for the purpose of making a new inhalation, viz :—

VAPOR OLEI PINI SYLVESTRIS.—Inhalation of Fir-wool Oil. (Take of Fir-wool Oil, 40 minims; Light Carbonate of Magnesium, 20 grains; Water, a sufficiency. Rub the fir-wool oil with the carbonate of magnesium, and gradually add sufficient water to produce one fluid ounce.)

This is a mild, stimulating inhalation, often useful in chronic congestion and inflammation of the larynx. We are told to put one fluid drachm of this mixture, with half a pint of cold water and half a pint of boiling water, into an apparatus so arranged that air may be made to pass through the solution and may afterwards be inhaled. But it is by no means necessary for the air to be compelled to pass through the liquid. Any of the common inhalers may be employed, or an ordinary jug will serve, as it does daily in hundreds of cases where volatile vapours are inhaled.

OLEUM SANTALI.—OIL OF SANDAL WOOD.

This oil, distilled from the wood of *santalum album*, has long been in use as a substitute for *copaiba*. It having been

considered less nauseous. But its own odour and flavour is intense and persistent, and some persons consider it worse than copaiba itself. It is rather thick, pale, neutral, or very feebly acid in reaction, soluble in alcohol, and its sp. gr. is about 0.96. Its medical qualities have not been very accurately determined, but probably it has the property of acting on mucous surfaces much as other essential oils.

Dose.—10 to 30 minims twice or three times a day in an emulsion or in capsules.

MENTHOL. $C_{10}H_{20}O$.

Oil of peppermint after long standing or at low temperatures deposits a stearoptene called peppermint camphor or menthol. Chinese oil seems to contain a much larger proportion, and it is this which has lately come into European markets. It may replace for some purposes our English oil—certainly for all external uses. It has been used for ages in China as a local anodyne in neuralgic and rheumatic pain—being freely applied, and a wet cloth laid over to restrain evaporation. Toothache may often be arrested by placing in the cavity a small crystal or a little absorbent wool soaked with a strong alcoholic solution, or a solution in chloroform, 20grs. in $1\frac{1}{2}$ drachms, may be used. Menthol is also soluble in oleic acid, which may be utilised as a menstruum; or it may be rubbed on a painful part in neuralgia and migraine, for which the mounted cones introduced by Mr. Christy are very convenient. It seems to exercise an anæsthetic effect on the nervous periphery, but it is also a distinct vascular stimulant, and may even be termed rubefacient.

Internally, it exercises a depressant, and ultimately paralyzing, effect upon motor, sensory, and reflex centres in the brain and cord. In this way it may be antispasmodic, but for internal use English oil of peppermint should be preferred.

THYMOL. $C_{10}H_{13}HO$.

Thymol is a stearoptene obtained from the volatile oils of *Thymus vulgaris*, *Linn.*, *Monarda punctata*, *Linn.*, and *Carum Ajowan*, *Benth. and Hook.* (*Ptychotis Ajowan*, *DC.*), *Benth. and Trim. Med. Pl.* vol. iii. plates 205 and 208, and vol. ii. plate 120, by saponifying with caustic soda and

treating the separated soap with hydrochloric acid, or from a distilled fraction of the oil by exposure at a low temperature. It may be purified by recrystallisation from alcohol.

Characters and Tests.—Large oblique prismatic crystals having the odour of thyme and a pungent aromatic flavour. They sink in cold water, but on heating the mixture to a temperature of 110° to 125° F. ($43^{\circ}\cdot3$ to $51^{\circ}\cdot7$ C.) they melt and rise to the surface. Slightly soluble in cold water, freely soluble in alcohol, ether, and solutions of alkalis. The crystals volatilise completely at the temperature of a water bath. A solution of thymol in half its bulk of glacial acetic acid, warmed with an equal volume of sulphuric acid, assumes a reddish violet colour.

The chief source of thymol is oil of thyme, but this is not itself official. Refrigeration and distillation may alike be made to yield the product, and there is also an isomeric fluid form. Thymene, with which it is combined in the oil, is a terpene, which is unaffected by alkalis; but the thymol unites with them. Thus, in the process given, a thymate of sodium is first formed, or perhaps rather a thymol sodium soap.

Thymol has been much used in the antiseptic system, its fragrance being so much more agreeable than the odour of carbolic acid, but it seems to be losing ground, except for special purposes. Though it arrests the development of some microzymes, others seem to be unaffected, and doubts have been thrown on its reliability as an antiseptic. Its fragrance may in hot weather be a disadvantage by attracting flies to the hospital ward or sick room. It is well adapted for mouth washes and gargles, and also as a vapour made and used in the same way as vap. *pini sylvestris*, than which it is more stimulating. For sprays, 1 in 1,000 is used; gauze, 1 per cent.; ointment, 5 to 30 grains in 1 oz.

Internally it has occasionally been given. It has produced tinnitus, deafness, profuse perspiration, reduction of blood pressure, respiration, and temperature. In larger quantities it paralyses the nerve centres in the cord and medulla, and this does not appear to be preceded by a stage of excitement, as is the case with carbolic acid, which it somewhat resembles in its action. Silva gave large quantities in typhoid, pneumonia, &c., without observing any ill effects. It reduced temperature. It has also been used in diphtheria, in septic conditions, in diabetes, and in vesical catarrh.

Elimination—by lungs and kidneys, stimulating these organs

and setting up congestion and inflammation according to the amount excreted. Albuminous bloody urine, and bronchio-pneumonia may occur in cases of poisoning.

It is not well adapted for internal use, and we have other antiseptic stimulants to the respiratory and genito-urinary membranes which are better understood.

Dose.— $\frac{1}{2}$ grain to 2 grains.

CUBEBA.

OLEO-RESINA CUBEBAE is taken from the U. S. P. The cubebs are exhausted by percolation with ether, which on evaporation yields volatile oil and resin with some crystalline and waxy matter. Left at rest till these are deposited, the oleo-resin is poured off. Introduced by Prof. Proctor, it was carefully examined by F. V. Heydenreich, who found the oil only stimulant and carminative, while the resin was powerfully diuretic. This last in 5 grain doses every two hours greatly increased the urine and caused a burning sensation in the urethra, which ceased on leaving off the medicine. More than 4 or 5 doses at such short intervals produced severe irritation along the urethra, with fever. The oleo-resin may therefore be considered to contain the chief virtues of cubebs.

Dose.—5 to 30 minims three or four times a day in capsules, or suspended in water with gum and sugar.

NEW ACTIVE PRINCIPLES AND PLANTS.

CAFFEINA.—CAFFEINE.— $C_8H_{10}N_4O_2, H_2O$.*Synonyms.*—Caffeia ; Theina ; Guaranina.

An alkaloid usually obtained from the dried leaves of *Camellia Thea*, *Link.*, or the dried seeds of *Coffea arabica*, *Linn.*, by evaporating aqueous infusions from which astringent and colouring matters have been removed.

Characters and Tests.—Colourless, silky, inodorous, acicular crystals. Soluble in 80 parts of cold water, the solution having a faintly bitter taste and being neutral to litmus. More soluble in boiling water and in rectified spirit, and very soluble in chloroform ; sparingly soluble in ether. At 212° F. (100° C.) the crystals lose 8.49 per cent. of their weight, and at a higher temperature melt and volatilise without decomposition. Treated with a crystal of chlorate of potassium and a few drops of hydrochloric acid, and the mixture evaporated to dryness in a porcelain dish, a reddish residue results, which becomes purple when moistened with ammonia. In an aqueous solution of the alkaloid, tannic acid gives a white precipitate soluble in excess of the reagent.

Preparation.—Caffeinæ Citras.

Caffeine is here assumed to be identical with theine, theobromine, and guaranine, but I have observed differences in the alkaloids from these sources, which may prove of some importance. Caffeine is rather insoluble, and possesses only very feeble basic qualities—hence the formation of salts is not easy. Double salts with sodium enable us to obtain solutions adapted for hypodermic injection. Caffein 20 grains and salicylate of sodium $17\frac{1}{2}$ grains may be dissolved in 1 drachm of distilled water for extemporaneous use, 3 minims containing 1 grain of the alkaloid—but it is better to use a more definite salt.

[The author has obtained from certain preparations a degree of local anæsthesia, experimenting with a view of comparing them with salts of cocaine. (*Lancet*, 1885)].

Some of the properties of coffee doubtless depend on the empyreumatic oil, but both coffee and caffeine are stomachic and stimulant in moderate doses. The alkaloid is also said

to be slightly laxative, like the infusion. It is also reputed to increase a tendency to piles by causing dilatation of the hæmorrhoidal veins. Possibly the intestinal secretion is increased, but certainly not to any great extent, except in very large doses, which may set up gastro-intestinal irritation. The brain is stimulated, as seen in the wakefulness, rapid flow of ideas, and excitement. The cord is also stimulated, and in the lower animals convulsions occur. The respiratory and cardiac centres in the medulla are stimulated, and probably the heart substance too, as both voluntary and involuntary muscular fibre appears to be excited by it, and the cardiac contractions are accelerated, and more easily executed by even moderate doses. Pulse, respiration, and blood pressure rise at first, but fall later, and are soon depressed by large quantities. Temperature is unaffected by small doses, but rises under large ones, and probably the tendency is to increase metabolism.

Elimination by kidneys and liver—stimulating both. The urine is increased in its solid constituents as well as the water.

Use—as a nervine stimulant and stomachic, in weak digestion. To deaden the sense of fatigue, especially from mental work, but care must be taken lest it cause wakefulness, and so add to the disorder. In some cases of dyspeptic palpitation. In migraine and cerebral headache it is often successful. As a diuretic it is suitable in both hepatic and cardiac dropsy, and does not interfere with the use of digitalis.

Dose.—The official dose is given as 1 to 5 grains of caffeine, and 2 to 10 of the citrate. The larger dose will sometimes give rise to unpleasant effects, though it has often been exceeded. The alkaloid should be given in pills. The citrate in solution.

CAFFEINÆ CITRAS.—Citrate of Caffeine.— $C_8H_{10}N_4O_2, H_3C_6H_5O_7$.—A weak compound of caffeine and citric acid. (Take of Caffeine, 1 oz.; Citric Acid, 1 oz.; Distilled Water, 2 oz. Dissolve the citric acid in the water, and stir the caffeine into the heated solution. Evaporate to dryness on a water-bath, constantly stirring towards the end of the operation. Reduce to a fine powder).

Characters and Tests.—A white inodorous powder with an acid and faintly bitter taste and an acid reaction on litmus. It is soluble in a mixture of two parts of chloroform and one

part of rectified spirit. With a little water it forms a clear syrupy solution, which on dilution yields a white precipitate of caffeine that redissolves when ten parts of water have been added. Heated in the air, the salt chars and burns, leaving a mere trace of ash. From a boiling aqueous solution excess of lime water gives a white precipitate. Tannic acid yields a white precipitate soluble in excess of the reagent. If to a little of the salt a crystal of chlorate of potassium be added, and a few drops of hydrochloric acid, and the mixture be evaporated to dryness in a porcelain dish, a reddish residue results, which becomes purple when moistened with solution of ammonia.

Dose.—2 to 10 grains, in solution. This compound is not a true salt; it is doubtful if it is more than a mechanical mixture. It has often been given in effervescent draughts, and the so-called granulated citrate is a popular remedy for headache. More definite salts would be preferable.

COCA OR CUCA.

The dried leaves of the *Erythroxylon Coca* are in the U. S. P. under the name *Erythroxylon*, which, if not convenient, has the merit of being unmistakable. It might have been supposed that a committee of the General Medical Council would have adopted the suggestion of the late Sir Rob. Christison, one of the most distinguished men who have graced its board, to spell the name *CUCA*. This would more properly convey the pronunciation of the native name, and serve to distinguish it from cocoa. Happily *cuca* is recognised officially as a synonym. The leaves were in use among the natives of Peru before the Spanish conquest, and have continued to be employed to the present day. They are mixed with a little lime, or the ashes of certain plants, or other substance, and chewed for the purpose of enabling them to endure fatigue and privation of food, as described by Weddell, Mantegazza, and other travellers. They were also used as a tea. The alkaloid was isolated, in 1855, by Gardeke, and named by him *erythroxylene*; but Niemann, of Goslar, who very carefully examined the leaves, called it cocaine; and it has since generally obtained the shorter name. The leaves also contain a volatile alkaloid, *hygrine*, which, when treated with HCl, splits up into benzoic acid and another alkaloidal body, *ecgonine*: a tannin, coca-tannic acid, which gives a green

black with ferric salts, is also present. Cocaine is so easily decomposed by warmth and moisture, that great care is required in drying, storing, and transporting the leaves. The heating which is apt to occur in imperfectly dried leaves during the voyage, might destroy the alkaloid.

The plant has long been cultivated largely in Peru. In South America it not only to some extent supplies the place of our tea or coffee, but is believed to support the strength in the absence of food. Christison found that it enabled him to undertake the ascent of mountains, and to fast for many hours without feeling the usual fatigue or hunger. Though it did not prevent his taking food, or produce any distaste for it, he was able under its influence to fast and accomplish hard work, without inconvenience and even with a sense of satisfaction and comfort.

The slight stimulation or feeling of well-being is said not to be followed by depression or languor, but this would only apply to moderate doses, as the effect of large quantities would depress (Cf. Cocaine, *infra*). It is said to lessen the amount of urea excreted, an effect which, if produced, may be supposed to be due to retarded metabolism.

Use.—As a mild tonic or stimulant or restorative in muscular exhaustion, in convalescence, in debility. Has been recommended in wasting when excess of urea is excreted. Also to assist the victims of alcohol or morphia to discontinue their habit. For these purposes, the fluid extract, now made official, may be used instead of the costly alkaloid. (Cf. Cocaine).

EXTRACTUM COCÆ LIQUIDUM.—Liquid Extract of Coca.—Take of Coca, in No. 40 powder, 20 ounces; Proof spirit, a sufficiency. Mix the coca with two pints of the spirit, and macerate in a closed vessel for forty-eight hours; then transfer to a percolator, and when the fluid ceases to pass, continue the percolation with more of the spirit until the coca is exhausted. Reserve the first fifteen fluid ounces of the percolate, and evaporate the remainder by a water bath to the consistence of a soft extract, dissolve this in the reserve portion, and make up the volume to twenty fluid ounces by the addition of more spirit.

Dose.— $\frac{1}{2}$ to 2 fluid drachms.

COCAINÆ HYDROCHLORAS.— $C_{17}H_{21}NO_4.HCl$.

Hydrochlorate of Cocaine.

The hydrochlorate of an alkaloid obtained from the leaves of *Erythroxylon Coca*, *Lamarck*. It may be obtained by agitating with ether an aqueous solution of an acidulated alcoholic extract, made alkaline with carbonate of sodium; separating and evaporating the ethereal liquid, purifying the product by repeating the treatment with acidulated water, carbonate of sodium, and ether; decolorising; neutralising with hydrochloric acid, and recrystallising.

Characters and Tests.—"In almost colourless acicular crystals or crystalline powder, readily soluble in water, alcohol, and ether (?). Its solution in water has a bitter taste; gives a yellow precipitate with chloride of gold; and a white precipitate with carbonate of ammonium, soluble in excess of the reagent (?). Its solution produces on the tongue a tingling sensation followed by numbness. The aqueous solution dilates the pupil of the eye. It dissolves without colour in cold concentrated acids, but chars with hot sulphuric acid. The solution yields little or no cloudiness with chloride of barium or oxalate of ammonium."

The above official account is very misleading. The properties of the alkaloid and its hydrochlorate are so confused that the description applies to neither. Hydrochlorate of Cocaine is extremely soluble in water—even dissolves in less than its own weight; but it is not readily soluble in ether. On the other hand, the pure alkaloid readily dissolves in ether or alcohol; though it is very sparingly soluble in water. Further, Dr. B. H. Paul found that a very large excess of ammonia could be added without causing any sensible reduction of the precipitate, and he recommends ammonia as the best reagent, since it does not decompose the alkaloid as soda does.

Cocaine is a very sensitive alkaloid, and is only present in small proportion in the plant. It may therefore be easily changed or destroyed. Its extraction in a state of purity is attended with some difficulty, and different specimens have varied much. Some of the effects have been attributed to the possible presence of hygrine, which seems to be an irritant. It seems, however, that ecgonine would more

probably be present. Prof. Bignon, of Lima, found that a derivative easily soluble in water but uncrystallizable, and which he thought must be a glucoside, was easily formed in solutions of cocaine. Dr. Paul found that the action of water or of heat on cocaine converted some of it into benzoyl ecgonine, in which a methyl group has been displaced by hydrogen. Skraup has endeavoured to effect the reverse of this, that is, to replace the methyl group, and so reproduce the cocaine from ecgonine by synthesis, and he claims to have thus converted a small quantity.

LAMELLÆ COCAINÆ contain $\frac{1}{200}$ gr. each

Although Niemann had long before remarked that cocaine solution, besides its bitter taste, produced a peculiar numbness on the tongue, followed by a sensation of coldness, it was only in 1884, at the Ophthalmological Congress at Heidelberg, that Dr. Köller conclusively demonstrated that local anæsthesia could be produced by this substance to such a degree that operations on the eye could be performed without causing pain. Oculists were not slow to offer additional proof. The author at once tried it in the larynx, and reported complete success in removal of growths and other intralaryngeal operations (*Lancet*, Nov., 1884). He and many others have found it equally powerful in other situations—so that it is now generally known that operations on mucous membrane can be painlessly carried out by previously applying a solution. So the subcutaneous injection of a minute quantity anæsthetises the skin around the puncture sufficiently to allow of operations being performed. Evulsion of the nail, removal of piles, of urethral caruncle, &c., have been performed in this way, as well as many other painful operations; but, perhaps, the greatest success is in ophthalmic, nasal and laryngeal cases, although any mucous surface is speedily rendered insensitive by the drug, and, as stated above, the skin when it is used subcutaneously.

Applied to the eye, besides the anæsthesia, it produces a little lachrymation and enlargement of the palpebral opening, with paralysis of accommodation and marked dilatation of the pupil. In the mouth it suspends the power of taste, as well as the perception of touch. In the nose the sense of smell is also suspended. The author announced (*Lancet*) that it also acts in a striking manner on the circulation of the part to which it is applied—an observation abundantly confirmed. It at once produces pallor, and the part may be

completely blanched by it. In health this effect may last some time and then be repeated. So in disease it may be resorted to in order to remove congestion of mucous membranes, either a weak spray being employed or the part painted with a solution. This treatment is sometimes remarkably successful—especially in certain recent cases—but in others completely fails.

Brown-Sequard regards the effect as a new example of inhibitory action, his experiments convincing him that cocaine acts through the medium of the peripheral nerves on the nervous centres, which react in bringing about inhibition of sensibility. The phenomena which result from the injection of cocaine at the level of the larynx, he finds to be the same as those which are consecutive to the application of a jet of carbonic acid on the mucous membrane of that organ. Two minutes after the injection there is a generalised anæsthesia and an analgesia of the different wounds made on the body of the animal. The cutaneous anæsthesia lasts only a few minutes, but the analgesia of the wounds persists even till the following day. If fresh wounds are made, these, far from being analgetic, become, on the contrary, hyperalgetic. That which proved that cocaine acts on the nervous centres, and particularly on the cerebellum, is that injections of this substance produced sometimes a rolling motion to the side opposite to the injection, and at others a turning motion. Evidence of the inhibitory action is offered by another of Brown-Sequard's experiments: when the dose of cocaine injected was large enough to produce convulsions, it was sufficient to pull or forcibly flex the toes to immediately stop the convulsions. In animals which died under these conditions the temperature of the body after death was as high as $44^{\circ}4$ C., or $111^{\circ}6$ F.

When taken internally cocaine resembles caffeine in its action, producing in small doses a slight stimulant and restorative effect, removing the sense of fatigue and the pangs of hunger, and bringing on a pleasant sense of well-being and calm. There is some quickening of pulse and perhaps respiration. The blood pressure is raised. The thermometer also marks a slight rise. In larger quantities headache, deafness, tinnitus, giddiness, and delirium may be produced, but signs of depression of the nerve centres soon follow, the paralysing influence being manifested on the brain, the medulla, and the cord successively. The pulse is retarded, the

blood-pressure lowered. Respiration grows slower and more shallow, death taking place from suspension of this function.

Uses.—As a local anæsthetic by painting or in a spray. Solutions varying from 1 to 20 per cent. For spray to relieve pain and abate congestion 1 per cent. For ophthalmic operations a 4 per cent. solution is dropped into the eye, or the *lamellæ* may be used. In laryngeal phthisis 1 or 2 per cent. solution as a spray before eating, when the pain and cough, excited by swallowing, are severe. In intra-laryngeal operations 10 or 20 per cent. may be required, and the same perhaps for operations in the mouth, fauces, and nasal passages, whether by cutting or galvano-cautery.

In hay fever, acute rhinitis, vaginismus, pruritus vulvæ vel ani, &c., &c., it may be of service, the strength being regulated by the requirements.

Internally.—For most purposes fluid extract will suffice, but it was inevitable that the potent alkaloid should be also tried, and when it becomes less costly it will probably be more used. As a direct anodyne or anæsthetic to the stomach, it has been given with some benefit, but the effect is usually of short duration. Many report that it relieves the vomiting of pregnancy, and Dr. Manessein found it (*Berl. klin. Woch.*) arrest sea-sickness. He has also given it in cholera nostras.

The effects of toxic quantities have been stated above. It should be added that cases have been observed in which very unpleasant symptoms resulted from the absorption of the cocaine when employed locally. It is obvious, therefore, that some care is called for when the free use of the local anæsthetic is resorted to.

JABORANDI.—JABORANDI.

Synonym.—*Pilocarpi Foliola.*

The dried leaflets of *Pilocarpus pennatifolius*, *Lemaire*; *Pharm. Journ.* ser. 3, vol. v., page 582, plate.

Characters.—Leaflets very shortly stalked, usually four inches or more in length, oval-oblong or oblong-lanceolate, somewhat unequal at the base, obtuse and emarginate, slightly revolute and entire at the margins, coriaceous. Upper surface glabrous, except when young, dull green; under surface paler, often somewhat hairy, with a very prominent midrib, and seem to be marked irregularly all over with pellucid dots when held against the light. Odour when

bruised slightly aromatic; taste on chewing slightly bitter and aromatic at first, but subsequently pungent and increasing the flow of saliva.

The B. P. adopts the common name, though it is hard to see why *Pilocarpus*, as a declinable Latin word, should not have been employed, as the *P. pennatifolius* is distinctly stated to be intended; the U. S. P. calls it *Pilocarpus*, and the alkaloid is named *pilocarpine*. *laborandi*, *jaborandi*, and *iaborandi* are common names in Brazil for various sudorific and pungent plants.

Though only introduced to European practice about ten years ago by Dr. Coutinho, *jaborandi* rapidly established an important position, and has found its way into the American, German, and French pharmacopœias, and now into our own. Soon after a dose of *jaborandi*, or of its active principle, there is flushing of the face, ears, and neck, which progresses downward, travelling over the whole body. In from five to ten minutes after the dose the saliva begins to flow freely and soon afterward perspiration supervenes, and this lasts from two to five hours and is often so profuse as to soak through the clothes. As soon as the perspiration is free the flushing passes away. Féréol* noted an interchange between the amount of the salivation and the sweating, and this may sometimes be observed, for with profuse salivation there may be less sweating, and *vice versa*, but the rule is by no means absolute. Occasionally no salivation takes place, but it is scarcely ever that there is no sweating, though now and then we meet with individuals who seem to be almost insusceptible to the action of the medicine. It is curious that it has much less effect upon children than upon adults.

The amount of sweat transuded is somewhat enormous. The salivation, too, may be excessive, from a pint to a pint and a half being spit out, besides what is swallowed. Occasionally pain and swelling of the salivary glands follow, other secretions are also increased—the nasal, the bronchial, the lachrymal—but to a far less degree than the cutaneous and salivary; so we have watering of the eyes, sneezing, irritation of the nose, succeeded by coryza, and a loose cough with free expectoration. It is even said that the

* Féréol : Note sur le *Jaborandi* du Dr. Coutinho. 1875.

cerumen of the ears has been increased. Gastric uneasiness is often complained of, partly perhaps due to the saliva swallowed, which, indeed, is sometimes vomited. When jaborandi is taken the bulk of the remedy may help to cause uneasiness, but gastric disturbance is also observed after pilocarpine. Gubler observed that diarrhœa may be produced, but this is not frequently the case. He also thought the remedy acted as a diuretic, and in small doses it may do so, but scarcely when the sudorific action is marked. It has no effect on the bile, and it is doubtful whether it has on the milk.

The effect on the temperature is not so marked as might have been expected, an average fall of 1° Fahr. being established. Robin* thought that a slight rise preceded the fall; Riegel found no rise. More blood is sent to the skin, but the effect of this may be balanced by evaporation and radiation. The pulse rises some twenty to fifty beats, but Langley found an opposite effect produced in animals. The rise lasts from two to four hours, but the pulse is much weaker, and a good deal of depression is produced; the blood-pressure falls temporarily, then perhaps it rises a little, and finally a fall is established. The heart, though the beat may be quickened for a time, is decidedly weakened, so that when this organ is unequal to its work jaborandi is to that extent contra-indicated. Respiration is not directly affected. The narcotism, said to sometimes follow, is probably only the tendency to sleep after profuse perspiration.

Metabolism is increased and the body weight falls; the excess in the secretions is not merely water, but the solids are increased; thus abundance of salts and ptyalin are carried away by the salivation and an excess of urea by the perspiration. The sweat is said to be at first acid, afterwards neutral, and at last often alkaline. Robin found it contained excess of chlorides with some carbonates and phosphates, but much more important is the increase of urea to more than five times its normal amount. Hardy and Ball estimated that an average of seventeen grains was eliminated by the skin in their experiments, and some even higher estimates have been made.

* Études physiologiques et thérapeutiques sur le Jaborandi. 1875.

Jaborandi sometimes affects the sight a little, but without altering the size of the pupil; its local application, however, brings on contraction and impairment of vision, lasting from an hour and a half to occasionally twenty-four hours. Mr. John Tweedy concludes (*Lancet*, 1875) that locally applied it causes (1) contraction of the pupil; (2) tension of the accommodative apparatus of the eye, with approximation of the nearest and farthest points of distinct vision; (3) amblyopic impairment of vision from diminished sensibility of the retina.

The action of jaborandi is antagonised by belladonna; a hypodermic injection of $\frac{1}{100}$ grain of atropine almost invariably arresting the sweating and salivation, and in case of excessive action it may be desirable to resort to this antidote.

The increase in the salivary secretion is probably due to a direct action on the gland or the ends of its nerves, as well as to stimulation of the centre. Carville has shown (*Journ. de Thérap.*, 1875) that section of the chorda tympani high up or low down after it has joined the gustatory nerve does not prevent the sialogogue action of the drug. Free salivation was produced even after section of both the gustatory and pneumogastric nerves and destruction of the upper cervical ganglion of the sympathetic. The sweating is also due to direct action on the nervous periphery, as well as on the centre, and perhaps the sweat-glands are stimulated in the same manner as the salivary. The sphygmograph shows lowered vascular tension. The cardiac depression is partly due to the action on the vagus and partly, perhaps, to direct action on the ganglia.

Use.—To produce a single copious sweat in almost any disease jaborandi may be employed. It may therefore serve as a substitute for the Turkish bath or the lamp bath, and take the place of other sudorifics. In renal dropsy it seems to be indicated, as we have seen that it greatly increases the elimination of urea. It is said to have cut short uræmic convulsions—perhaps by rapid removal of urea. Anasarca and other dropsical effusions may also be removed by this medicine.

A dose will often cut short a recent cold in the same way as any other sudorific. In asthma it has sometimes been found to give relief; so it has in pertussis. When the temperature is high and there is a good deal of sthenic excitement, it is well to combine it with an arterial sedative.

In pleuritic effusion, when there is no cardiac weakness, jaborandi may be employed. In diphtheria somewhat contradictory statements have been made. Guttman regards pilocarpine as a specific; Jacobi considers that in septic cases it accelerated death by hastening cardiac failure, but in many cases he found that the membrane was softened and separated by the copious secretion produced. He therefore attributed the recovery, 1, to the macerating effect; 2, to the timely withdrawal of the alkaloid. It seems certain that the remedy greatly increases the secretion of the respiratory mucous membrane and renders it more fluid, thus tending to disintegrate and separate the false membranes. It may, therefore, be useful in bronchial affections, but the effect on the heart must not be forgotten. A single dose has sometimes produced collapse.

Its remarkable power of producing rapid elimination has caused it to be used in a great number of conditions.

Dose.—5 to 60 grains, but it is generally used either in one of the following preparations or the alkaloid is injected subcutaneously.

EXTRACTUM JABORANDI.—Extract of Jaborandi.—Jaborandi, in No. 40 powder, 1 pound; Proof Spirit and Distilled Water, of each a sufficiency. Mix the Jaborandi with two pints of the spirit, and macerate in a closed vessel for forty-eight hours; then transfer to a percolator, and when the fluid ceases to pass, continue the percolation with water until two pints of liquid have been collected. Evaporate the percolated liquid until the extract has acquired a suitable consistence. *Dose.*—2 to 10 grains.

INFUSUM JABORANDI.—(Infuse 1 part, cut fine, in 20 fluid parts for half an hour, and strain.) *Dose.*—1 to 2 fluid ounces.

TINCTURA JABORANDI.—(Jaborandi, in No. 40 powder, 5 ounces; Proof Spirit, 1 pint; by maceration and percolation combined as in other cases.) *Dose.*— $\frac{1}{2}$ to 1 fluid drachm.

PILOCARPINÆ NITRAS.

Nitrate of Pilocarpine ($C_{11}H_8N_2O_2, HNO_3$).

The nitrate of an alkaloid obtained from extract of jaborandi by shaking it with chloroform and alkali, evaporating

the chloroformic solution, neutralising the product with nitric acid and purifying by recrystallisation.

Characters and Tests.—In a white crystalline powder or in acicular crystals; soluble in eight or nine parts of water at common temperatures; slightly soluble in cold, freely soluble in hot rectified spirit. Strong sulphuric acid forms with it a yellowish solution which, on the addition of bichromate of potassium, gradually acquires an emerald-green colour. It leaves no ash when burned with free access of air. It causes contraction of the pupil of the eye.

Pilocarpine is the active principle of *Jaborandi*; was discovered by Mr. Gerrard in 1875, and he stated at the time that he believed there were at least two alkaloids in *Jaborandi*. M. Hardy about the same time isolated pilocarpine, the salts of which have been largely employed by subcutaneous injection.

The nitrate, now official, is one of the most soluble, but others can be used—acetate, phosphate, hydrobromate, salicylate, hydrochlorate; the last-named was introduced into the U.S.P. The alkaloid can be obtained from the salts by dissolving crystals in water, treating with ammonia and chloroform, and evaporating. It then is formed as a soft, viscous mass, only slightly soluble by water, but freely so in alcohol, chloroform, and ether.

Pilocarpine, as the active alkaloid, is, of course, much more potent than *Jaborandi*. Auschmann and others reckon 0.3 of a grain as equal to 75 grains of the best leaves. The salts being fairly soluble are employed, and they possess all the valuable therapeutical properties of the plant. Moreover they have the advantage of being so much less disagreeable, and are much more easily tolerated by the stomach. They are well adapted for subcutaneous injection.

Dose.— $\frac{1}{20}$ to $\frac{1}{2}$ grain is given officially as the dose of *Pilocarpinæ Nitras*.

This is intended, evidently, to be given by the mouth, but Pilocarpine is mostly given by the subcutaneous method, and the maximum is too high for that purpose. From $\frac{1}{12}$ to $\frac{1}{4}$ grain would more nearly represent the doses usually employed. From $\frac{1}{12}$ to $\frac{1}{6}$ grain will generally be found sufficient. In special cases $\frac{1}{3}$ grain may be required. Inasmuch as the effect is very quickly set up, if too small a dose be given at first it can be reinforced with more, and the

depressant action of too much thus avoided. A fresh solution can be made in water, and if required to keep for a time, camphor water may be used. I have generally used gelatine discs, and this medicine would have been a good addition to the new Lamellæ.

Jaborine (not official) is the name of another alkaloid obtained from *jaborandi* by Harnack and Meyer, who state that it may easily be formed from pilocarpine by the aid of heat. They found it to be antagonistic to pilocarpine, and to rather resemble atropine in its action. Perhaps some of the conflicting statements of different observers may be reconciled by referring them to the presence of the second alkaloid, though it is never in such amount as to neutralise the pilocarpine in a dose of *jaborandi*.

GELSEMIUM.

This is the American yellow, or Carolina jasmine, a beautiful climbing plant with fragrant flowers, which are reported to be very poisonous. It flourishes in moist, rich soils along the sea coast from Virginia to the south of Florida. The part employed in medicine is the dried rhizome and rootlets of *Gelsemium nitidum*, *Michaux* (*Gelsemium sempervirens*, *Aiton*); *Bentl. and Trim. Med. Pl.* vol. iii. plate 181.

Characters.—Nearly cylindrical, from half an inch to six inches or more in length, and commonly from a quarter to three-quarters of an inch in diameter, with small rootlets attached to, or mixed with, the larger pieces; light yellowish-brown externally, and marked longitudinally by dark purplish lines; fracture splintery; bark thin, presenting silky fibres in its liber, and closely attached to a pale yellow porous woody axis, with evident medullary rays, and with or without pith. Odour somewhat narcotic and aromatic; taste bitter.

Dose.—5 to 30 grains.

Gelsemium has been of late years extensively used in America as a depressant in febrile and inflammatory diseases of a sthenic type, as well as in neuralgia. I. Ott, Bartholow, Wormley, and Berger have investigated it in the States, and Drs. Ringer and Murrell in this country (*Lancet*, 1877.) It contains an alkaloid, *gelsemine*, in combination with *gelseminic acid*, both discovered by Prof. Wormley. The alkaloid has strong basic properties, its salts are soluble in water,

it has a very bitter persistent taste, and is extremely poisonous. One-eighth of a grain was fatal to a strong cat in $1\frac{1}{2}$ hours, and Prof. Wormley calculates one-sixth grain would be fatal to a man. Gelsemium is a powerful depressant; it paralyses the spinal cord, acting both on the motor and sensory portions. In frogs this may be followed by tetanus. After full doses, diplopia, dilatation of pupils, dizziness, intense muscular weakness, feeble pulse, and diminished sensibility may occur. After larger quantities these symptoms are intensified, and death mostly occurs from respiratory paralysis, consciousness continuing quite late, but being lost usually before the end. Applied to the eye, it dilates the pupil, and paralyses accommodation.

Use.—As a depressant and arterial sedative in sthenic pyrexia. To allay pain in neuralgia, especially of the fifth nerve. In sick-headache and toothache 1 to 3 doses sometimes relieve. Has also been used in pertussis, spasmodic cough, asthma, rheumatism, and various convulsive and painful affections. The effect should be watched, as accidents have been recorded. The alkaloid is too powerful for internal use. The tincture is the best preparation to employ. The extract was scarcely called for, and the dose seems rather a matter of calculation than experience.

EXTRACTUM GELSEMII ALCOHOLICUM.—Alcoholic Extract of Gelsemium.—Take of Gelsemium, in No. 60 powder, 1 pound; Rectified Spirit and Distilled Water, of each a sufficiency. Mix the gelsemium with 2 pints of the spirit, and macerate in a closed vessel for 48 hours; then transfer to a percolator, and when the fluid ceases to pass continue the percolation with water until 2 pints of liquor have been collected. Evaporate the percolated liquor by a water-bath until the extract has acquired a suitable consistence.

Dose.— $\frac{1}{2}$ to 2 grains.

TINCT. GELSEMII is made by maceration and percolation with proof spirit (rectified would have been better) in the manner usually adopted in the B. P., with $2\frac{1}{2}$ oz. of Gelsemium in No. 40 powder, to make 1 pint.

Dose.—5 to 20 minims.

(ANDIRA) ARAROA.

From this plant we obtain Goa Powder or Araroba Powder, now named

CHRYSAROBINUM—CHRYSAROBIN.

It consists of the medullary matter of the stem and branches of *Andira araroba*, *Aguiar.*; *Pharm. Journ.* 3rd ser. vol. x. p. 43, plate; dried and powered; containing more or less chrysophanic acid according to age and condition, and yielding much chrysophanic acid by oxidation.

Characters and Tests.—A light brownish-yellow minutely crystalline (?) powder, tasteless and inodorous. Very sparingly soluble in water, but almost entirely soluble in 150 parts of hot rectified spirit. On heating it melts and partially sublimes in yellow vapours, leaving a charred residue, which entirely disappears on ignition in air. It dissolves in sulphuric acid to form a yellow to orange-red solution, and in solution of caustic potash to form a yellow to reddish fluorescent solution, which becomes carmine by absorption of oxygen from the air.

The description of the B. P. seems to confuse Goa powder and Chrysophanic acid. The latter crystallizes but the former is certainly amorphous. Goa powder has been to some extent employed, but since Mr. B. Squire drew attention (1876) to the power of Chrysophanic acid over Psoriasis, that substance has been usually prescribed. It is not easy to imagine why an indefinite powder should find a place in the B. P. instead of a definite crystalline substance. Chrysophanic acid is certainly the active agent, and forms, according to Prof. Attfield's research, about 80 per cent. of Goa powder.

It is chiefly used externally in psoriasis, and some other skin affections, especially vegetable parasitic diseases. It discolours the part to which it is applied, often produces some local irritation, and even constitutional disturbance. It is of course unfit for application to the head and face, on account of its staining the surface, but is further apt to produce œdema, &c. Erysipelas sometimes follows its use. Patients should be warned not to inadvertently touch the eyelids with it, as severe inflammation may be so caused.

Complaints have lately been made (*Journ. Cut. Med.*) of its quality, and it is feared that the demand has led to adulteration.

Internally.—Sometimes given in eczema, psoriasis, &c., but it is apt to derange the stomach and bowels.

Dose. $\frac{1}{6}$ to $\frac{1}{2}$ grain in pill.

UNGUENTUM CHRYSAROBINI.—(1 in 24 of Benzoated Lard.)—A stronger ointment has often been used.

ACTÆA.—CIMICIFUGA.

Actæa racemosa was lauded by the late Sir James Simpson as valuable in rheumatism, &c. After a run, it fell into disuse. It has kept its place in America, where it is a popular remedy, called cohosh and black snake root, it having once been reputed to be effectual against the bite of a rattlesnake. Perhaps the name *cimicifuga* was given as an indication that the *cimex* dislikes it. This is the name in the U. S. Pharm. to which our compilers are so much indebted. Howbeit in that disguise it comes, an old friend—or at any rate, acquaintance—with a new name.

CIMICIFUGÆ RHIZOMA.

Synonym.—*Actææ Radix.*

The dried rhizome and rootlets of *Cimicifuga racemosa*, *Elliott* (*Actæa racemosa*, *Linn.*); *Bentl. and Trim. Med. Pl.* vol. i. plate 8.

Characters and Tests.—The rhizome is from about two to six inches long, and from half an inch to an inch thick, hard, somewhat flattened-cylindrical in form, having on its upper surface the remains of several ærial stems, and below numerous small wiry brittle branched rootlets, which in commercial specimens are more or less broken off. Both rhizome and rootlets are brownish-black, almost odourless, and of a bitter, slightly acrid taste. Their fracture is close, that of the rootlets presenting a thick bark, and a central axis with from three to five, usually four, converging woody wedges, so as to assume a triangular, cross-like, or stellate appearance. An infusion is blackened by a persalt of iron.

Preparations.—*Extractum Cimicifugæ Liquidum* and *Tinctura Cimicifugæ.*

Its influence seems to be chiefly over the nervous system, and rather of a sedative character. It lowers the pulse, and is considered in small doses stomachic and also expectorant. Its sedative character is said to be more marked in morbid conditions of the system. In large quantities it lessens the pulse in force and frequency, and resembles *digitalis*. It is eliminated by the kidneys, and promotes diuresis as well as diaphoresis. It is easy to see that it might readily obtain

repute in those nervous ailments for which it has been most used, and equally easy to see that it might have been left in the shade of unofficial remedies, but the student is burdened with two preparations of it.

TINCT. CIMICIFUGÆ.—(Cimicifuga in No. 40 powder, $2\frac{1}{2}$ oz.; proof spirit, 1 pint, by maceration and percolation.)

Official Dose.—18 to 60 minims.

EXTRACTUM CIMICIFUGÆ LIQUIDUM (20 oz. in the pint with S.V.R.).

Dose.—3 to 30 minims.

STAPHISAGRIÆ SEMINA.—STAVESACRE SEEDS.

The dried ripe seeds of Delphinium Staphisagria, *Linn.*; *Bentl. and Trim. Med. Pl.* vol. i. plate 4.

Characters.—Irregularly triangular or obscurely quadrangular, arched, blackish-brown when fresh, but becoming dull greyish-brown by keeping. Testa wrinkled and deeply pitted; nucleus soft, whitish, oily. No marked odour; taste nauseously bitter and acrid.

Preparation.—Unguentum Staphisagriæ.

Staphisagria was in use formerly as an active emetic and cathartic, but its action was so violent it has been practically given up to external use. Bazin gives an extract internally in eczema, $\frac{1}{2}$ grain doses, ter die. It contains two distinct alkaloids—*Staphisagrine*, which resembles curarine in its action, and *Delphinine*, which has more affinity with aconitine.

UNG. STAPHISAGRIÆ is made by macerating crushed seeds in twice their weight of benzoated lard melted over a water bath for 2 hours and straining.

This ointment contains about 10 per cent. of oil of stavesacre and is used as a parasiticide in phtheiriasis and scabies. B. Squire recommends in prurigo senilis, ointment made with the expressed oil (1 in 7).

NEW PREPARATIONS

FROM FORMERLY OFFICIAL ORGANIC SUBSTANCES.

CINCHONA.

A change, which it is to be hoped examiners will allow to operate as a relief to students, has been made in reference to cinchona. Henceforth the name *cinchonæ cortex* will include *C. calisaya*, *C. officinalis*, *C. succirubra*, *C. lancifolia*, and other species, from which the "peculiar alkaloids of the bark may be obtained." Moreover salts of quinine and cinchonine "may be also obtained from some species of *Remijia*."

But, in making the preparations of cinchona—decoctum, extractum liquidum, infusum acidum, tinctura, tinct. composita, and mist. ferri aromat, Red Cinchona Bark,

CINCHONÆ RUBRÆ CORTEX,

is now directed to be exclusively used. The terms *cinchona*, *pallida*, and *C. flava* thus disappear, and the only official bark for internal use is to be the dried bark of the stem and branches of cultivated plants of *cinchona succirubra*. Unless merely used for the extraction of alkaloids, it should contain between 5 and 6 per cent. of total alkaloids, of which not less than half should consist of quinine and cinchonidine. The amount may be estimated by the following methods, condensed from the official description:—

1. *For Quinine and Cinchonidine*.—Mix 200 grains (in No. 60 powder), with 60 grains of hydrate of calcium; slightly moisten with half an ounce of water; after standing for an hour or two, the mixture will present the characters of a moist, dark brown powder, in which there should be no lumps or visible white particles. Transfer to a 6 oz. flask, exhaust by boiling and percolation with benzolated amylic alcohol. Introduce the filtrate, while warm, into a separator; add to it 20 minims of diluted hydrochloric acid, with two drachms of water, shake well, and when the acid liquid has separated this may be drawn off, and the process repeated until the whole of the alkaloids have been removed. Exactly neutralise with ammonia while warm, and then concentrate to three

fluid drachms. If now about fifteen grains of tartarated soda, dissolved in twice its weight of water, be added to the hydrochlorates, insoluble tartrates of quinine and cinchonidine will separate completely in about an hour; these collected on a filter, washed, and dried, contain eight-tenths of their weight of the alkaloids, which, divided by 2, represents the percentage of those alkaloids. The other alkaloids will be left in the mother-liquor.

2. *For total alkaloids.*—To the mother-liquor from the preceding process add solution of ammonia in slight excess. Collect, wash, and dry the precipitate, which will contain the other alkaloids. The weight of this precipitate divided by 2, and added to the percentage weight of the quinine and cinchonidine, gives the percentage of total alkaloids.

EXTRACTUM CINCHONÆ LIQUIDUM has undergone such a change as to be practically a new preparation. It is to be standardised to contain 5 grains of the united alkaloids in 100 fluid grains. The introduction of this modern plan of producing fluids of definite strength is a step in the right direction.

The bark (red) is exhausted with water, to which a little hydrochloric acid and glycerine have been added. The liquid is evaporated down to the weight of the bark used, and tested by treating a weighed quantity with benzolated amylic alcohol, water, and soda solution in a separator. The spirituous solution contains the alkaloids, and being separated and evaporated, the residue gives the amount in the quantity tested. By evaporation or dilution as required, the extract is to be adjusted to contain 5 per cent. of alkaloids.

It remains to be seen how far this preparation will answer our expectation, but the dose has been placed at 5 to 10 minims, instead of the 15 to 30 of the former fluid extract.

INFUSUM CINCHONÆ ACIDUM.—This is to take the place of the simple infusion. It is made with red (instead of yellow) bark. The same quantities are used, but one fluid drachm of acid. sulph. aromat. is added to the 10 ounces of water—giving thus an acid infusion which cannot be used in combination with any remedy incompatible with sulphuric acid. It is well that the adjective “acidum” has been added to the name.

The following alkaloidal salts are now official : sulphates of quinine, cinchonidine, and cinchonine ; hydrochlorate of quinine.

CINCHONIDINÆ SULPHAS.

Sulphate of Cinchonidine.

$(C_{20}H_{24}N_2O)_2, H_2SO_4, 3H_2O$, may be obtained from the mother-liquors of the crystallisation of sulphate of quinine by further concentration, purified by crystallisation from alcohol and finally from hot water.

Characters and Tests.—In colourless silky crystals, usually acicular. Soluble in water, more freely if acid added. Has a bitter taste and a neutral or faintly alkaline reaction, not distinctly fluorescent, gives a white precipitate with chloride of barium. The aqueous solution yields a white precipitate with solution of tartarated soda, and in the filtrate from this mixture solution of ammonia occasions not more than a slight turbidity. It dissolves in pure sulphuric acid with production of not more than a faint yellow coloration, and the fluid undergoes no apparent change when gently warmed. Twenty-five grains lose 1.76 grain of moisture on drying at 212° F. (100° C.) No ash remains on ignition in air.

Dose.—1 to 10 grains.

CINCHONINÆ SULPHAS.

Sulphate of Cinchonine.

$(C_{20}H_{24}N_2O)_2, H_2SO_4, 2H_2O$, is obtained from the bark of various species of Cinchona and Remijia. It may be obtained from the mother-liquors of the crystallisation of the sulphates of quinine, cinchonidine, and quinidine, by precipitating the alkaloid with caustic soda, washing it with spirit until free from other alkaloids, dissolving in sulphuric acid, and, after purifying the solution with animal charcoal, allowing to crystallise.

Characters and Tests.—Hard, colourless, short, prismatic crystals, with a vitreous lustre. Soluble in water, more readily with acid. Has a bitter taste, a neutral or faintly alkaline reaction, and twists a ray of polarised light to the right, while the cinchonidine salt does the reverse. Acts with sulphuric acid as cinchonidine. Its acidified solution is not fluorescent, and gives a white precipitate with chloride of barium. Twenty-five grains should lose 1.26 grain of moisture when dried at 212° F. (100° C.), and on ignition in air no ash remains.

Dose.—1 to 10 grains.

QUININE.

We are to discontinue the word *quinia*, and write *quinina*, as in the case of all alkaloidal substances. Two salts of quinine are now official, the ordinary sulphate and the hydrochlorate.

QUININÆ SULPHAS.

Sulphate of Quinine.

Synonyms.—*Quiniæ Sulphas*; *Sulphate of Quinia*.

($(C_{20}H_{24}N_2O_2)_2H_2SO_4$) \cdot $5H_2O$.—The sulphate of an alkaloid prepared from the powder of various kinds of *Cinchona* and *Remijia* bark by extraction with spirit after the addition of lime, or by the action of alkali on an acidulated aqueous infusion, with subsequent neutralisation of the alkaloid by sulphuric acid and purification of the resulting salt.

The process of preparing is no longer detailed at length, but the account of the characters and tests has been revised and much extended. As these are interesting, and some crotchety examiner is likely to get "trying it on" with students, it may be well to give them at length.

Characters and Tests.—Filiform silky snow-white crystals, of a pure intensely bitter taste, sparingly soluble in water, that is 1 part in 700 or 800 parts at common temperatures, yet imparting to the water a bluish tint or fluorescent appearance. Entirely soluble in water acidulated by sulphuric acid. Its solutions give with chloride of barium a white precipitate insoluble in nitric acid, or when treated first with solution of chlorine and afterwards with ammonia they become of an emerald-green colour, and solution of ammonia gives with them a white precipitate of quinine soluble in ether and in excess of the solution of ammonia. It dissolves in pure sulphuric acid with a feeble yellowish tint, and undergoes no further change of colour when gently warmed. Twenty-five grains of the freshly prepared salt should lose 3·8 grains of water by drying at 212° F. (100° C.) Ignited with free access of air, it burns without leaving any residue.

Test for Cinchonidine and Cinchonine.—Heat 100 grains of the sulphate of quinine in five or six ounces of boiling water, with three or four drops of diluted sulphuric acid. Set the solution aside until cold. Separate, by filtration, the purified sulphate of quinine which has crystallised out. To the filtrate, which should nearly fill a

bottle or flask, add ether, shaking occasionally, until a distinct layer of ether remains undissolved. Add ammonia in very slight excess, and shake thoroughly, so that the quinine at first precipitated shall be redissolved. Set aside for some hours or during a night. Remove the supernatant clear ethereal fluid, which should occupy the neck of the vessel, by a pipette. Wash the residual aqueous fluid and any separated crystals of alkaloid with a very little more ether, once or twice. * Collect the separated alkaloid on a tared filter, wash it with a little ether, dry at 212° F. (100° C.), and weigh. Four parts of such alkaloid correspond to five parts of crystallised sulphate of cinchonidine, or of sulphate of cinchonine.

Test for Quinidine.—Recrystallise fifty grains of the original sulphate of quinine as described in the previous paragraph. To the filtrate add solution of iodide of potassium, and a little spirit of wine to prevent the precipitation of amorphous hydriodates. Collect any separated hydriodate of quinidine, wash with a little water, dry and weigh. The weight represents about an equal weight of crystallised sulphate of quinidine.

Test for Cupreine.—Shake the recrystallised sulphate of quinine, obtained in testing the original sulphate of quinine for cinchonidine and cinchonine, with one fluid ounce of ether and a quarter of an ounce of solution of ammonia, and to this ethereal solution, separated, add the ethereal fluid and washings also obtained in testing the original sulphate for the two alkaloids just mentioned. Shake this ethereal liquor with a quarter of a fluid ounce of a ten per cent. solution of caustic soda, adding water if any solid matter separates. Remove the ethereal solution. Wash the aqueous solution with more ether, and remove the ethereal washings. Add diluted sulphuric acid to the aqueous fluid heated to boiling, until the soda is exactly neutralised. When cold collect any sulphate of cupreine that has crystallised out on a tared filter ; dry, and weigh.

“Sulphate of Quinine” should not contain much more than five per cent. of sulphates of other cinchona alkaloids.

QUININÆ HYDROCHLORAS.

Hydrochlorate of Quinine.

Synonyms.—Quiniæ Hydrochloras ; Hydrochlorate of Quinia.

$C_{20}H_{24}N_2O_2HCl, 2H_2O$.—Obtained from the same sources and by the same process as sulphate of quinine, the separated alkaloid being neutralised by hydrochloric acid.

Characters and Tests.—In crystals resembling those of sulphate of quinine, but generally somewhat larger. It is soluble in about thirty-four parts of water or about three parts of spirit at common

temperatures, and very soluble in the boiling liquids. Its solution yields a green colour when treated with chlorine water and then with ammonia; with chloride of barium it gives only a faint turbidity; and with nitrate of silver a white precipitate insoluble in nitric acid. It may be converted into sulphate of quinine by dissolving it together with an equal weight of sulphate of sodium in ten times its weight of hot distilled water, and setting the mixture aside at 60° F. (15°·5 C.) for half an hour. Such sulphate should respond to the characters and tests that are mentioned under "Quininæ Sulphas." Dried at a temperature of 212° F. (100° C.) it loses nine per cent. of water.

Dose.—1 to 10 grains.

Preparation.—Tinctura Quininæ, 1 grain in 1 fluid drachm.

Hydrochlorate of quinine is more soluble than the sulphate, hence better adapted for making the tincture which is in future to be prepared with this salt. Moreover, weight for weight, it contains rather more of the alkaloid. But it requires 34 parts of water to dissolve it, and for subcutaneous injections we want a more soluble salt. Hydrobromate (soluble in 16 of water) would do better; has been introduced to the U.S.P., whence the B.P. has borrowed so freely. But the bisulphate, $C_{20}H_{24}N_2O, H_2SO_4, 7H_2O$, commonly sold as "soluble sulphate," though it contains 13 per cent. less alkaloid, is so much more soluble (about 1 in 10) as to bring it much nearer our requirements. This, which would probably have been a more useful addition, is made by crystallizing out from a solution of sulphate to which the additional molecule of acid has been added. Well washed and recrystallized, it gives a salt which at once dissolves in 10 parts of water without additional acid. Hypodermic injections are best introduced warm (not hot).

TINCTURA QUININÆ, made with hydrochlorate, and therefore about $\frac{1}{3}$ th stronger of alkaloid than the former. 160 grains in 1 pint of Tinct. orange.

Differences between the Alkaloids.—Quinine is the most certain and valuable, but the others may often be usefully substituted for it. The hydrochlorate being more soluble and stronger in alkaloid, is better adapted for subcutaneous injection, and will now, doubtless, come into more general use.

The B. P. admits two new alkaloids (as sulphates), cinchonidine and cinchonine, but quinidine is left out in the cold, although the opinion of the Indian Medical Cinchona Commission, of 1868, was that quinidine equals quinine as an

antiperiodic, and its salts are much more soluble. Cinchonidine was reported to rank next, and to be nearly as efficacious, and cinchonine was pronounced to be rather inferior; all were found to possess undoubted power in ague. The action of cinchonine and cinchonidine on infusoria, on fermentation, and on leucocytes, is very similar to that of quinine, but less energetic. Quinidine is nearly, if not quite equal, but cinchonine proved more toxic to dogs (Bernatzik) in the proportion of 5 to 4. It has been stated that the other alkaloids, when large quantities are needed, are more apt to set up disagreeable symptoms than quinine, and this is also said to be the case with the mixed alkaloids, which have been largely used of late years in India.

Doses.—The official dose of all 4 salts of the cinchona alkaloids is alike, viz., 1 to 10 grains—easy to remember for examination, but not of great practical use. The minimum (1 gr.) for quinine is constantly given as a simple tonic three times a day, and for this purpose may be doubled or trebled. As an anti-periodic 5 to 10 grains are often given in simple intermittents, and repeated every 4 to 8 hours during the interval. Or single doses of 15 or 20 grains in the interval are even more common.

In pernicious agues and tropical remittents much larger doses may be required. Piorry once gave 50 grains in a single dose, which cut short the disease. In other fevers as an antipyretic single massive doses are greatly favoured by Liebermeister,* who gives in typhoid from 22 to 45 grains; but such a dose is not repeated for 24, or more often 48, hours.

These massive doses, systematically employed by W. Vogt†, and soon after by Wachsmath‡ and others, obtained great vogue in Germany, and are certainly the most effectual as antipyretics.

As an antiseptic or germicide it would perhaps be rather desirable to keep the remedy circulating in the blood, so that more frequent doses—proportionately smaller—would seem indicated. The rate of elimination, judging from Thau's

* Ziemssens Cyclopædia, vol. I.

† Schweizerische Monatsschrift f. Prakt. Med., 1859.

‡ Archiv. f. Heilkunde, 1863.

experiments,* is from one-third to half during the first six hours, while three-fourths has escaped in 12 hours' time. These results correspond with clinical experience—that quinine is not a medicine requiring to be repeated very frequently.

The dose of cinchonine and cinchonidine should usually be about one-third larger than that of quinine. They are best taken in pills or wafer paper, but may be dissolved if required for a mixture, by the addition of acid as in the case of quinine. Hydrochlorate of quinine can be given in pill or solution.

Quinine Pills.—The pil. quiniæ of 1868 has been omitted, and there is now no quinine pill in the B. P. This is scarcely regrettable, as it is better for pills to be freshly made, and prescribers are thereby required to exercise more thought as to the dose. By means of Glycer. Tragac., now made official, 3 grains of quinine can be got into a small pill.

OPIUM.

Unless used only for the extraction of alkaloids, opium must be that obtained in Asia Minor and yield 10 per cent of morphine when dried, powdered and kept at 212° F. until it ceases to lose moisture. This standard is too low: the best opium yields more. Tinct. Opii is to be made with powder, and contains the soluble matter of 33 grains, nearly, in 1 fluid oz. = 3·3 grains of morphine per fl. oz., or about 0·75 per cent. = about $1\frac{1}{4}$ per cent. bimeconate of morphine, besides the other alkaloidal salts. Ext. Opii. is to be made from *powder*. Why?

Besides meconic acid—already described under Acids (p. 17)—the new Pharmacopœia gives an additional salt of morphine (the sulphate), and another liquor (bimeconate), as well as a tincture of chloroform and morphine. The alkaloid codeine also takes its place, and a salt of the derived alkaloid apomorphine (hydrochlorate) of which there is a hypodermic injection (2 per cent.).

Change of Strength! Note that Injectio Morphinæ Hypodermica has been increased in strength from 1 gr. in 12 min. to 1 gr. in 10 minims. A mistake between the two may add to the list of fatal errors, and there seems to have

* Thau. "Die Ausscheidung des Chinins beim Gesunden und Fiebernden," 1868.

been no object in the change. It is true that still stronger solutions have been used by some, but they have mostly remained in the hands of those who were intimately acquainted with them. What was really required was a better preparation. The acidity of this is objectionable, and it is apt to deteriorate, or some of the salt crystallises out round the stopper. The acetate does not seem the best salt for the purpose. Tartrate, introduced by T. and H. Smith, is better, and is sufficiently soluble without adding acid. It would have been safer to leave the old injection, and added another, or to have given us a better formula of the old strength. The dose of the subcutaneous injection is now placed at 1 to 5 minims. In all cases the first time a subcutaneous injection is used the dose should be small, on account of the differences in individual susceptibility.

MORPHINÆ SULPHAS.—SULPHATE OF MORPHINE

Synonyms.—Morphiæ Sulphas ; Sulphate of Morphia.

$(C_{17}H_{19}NO_3)_2, H_2SO_4, 5H_2O$. — This salt is prepared by diffusing the morphine of the process for obtaining hydrochlorate in about twice its weight of boiling distilled water, and adding to the fluid, kept hot, diluted sulphuric acid, gradually and with constant stirring, so that the morphine may be entirely dissolved, and a neutral solution obtained. Set aside to cool and crystallise. Drain the crystals, and dry them on filtering paper. By further evaporating the mother liquor, and again cooling, additional crystals are obtained.

Characters and Tests.—Colourless, silky, acicular crystals; soluble in twenty-four parts of water at common temperatures; sparingly soluble in rectified spirit. From its solution potash gives a precipitate which is soluble in excess, chloride of barium a white precipitate insoluble in hot hydrochloric acid. Moistened with strong nitric acid, it becomes orange-red; and, with solution of perchloride of iron, greenish-blue.

Dose.— $\frac{1}{8}$ to $\frac{1}{2}$ grain.

It seems more natural to prescribe sulphate of morphia, instead of the other salts, when giving it in combination with sulphates. A solution keeps rather better, but in time fungi are sure to appear in it. Solutions of morphine readily spoil

in this way, and the student will remember that the *liquores* contain a little of the respective acid and spirit. An aqueous solution may, however, be prepared by using boiling distilled water, which will keep some time. A preservative may also be added—a minute quantity of boric or salicylic acid. About twice as much chloral as morphine will also act as a preservative. Again, if pure camphor water be used, the solution will keep indefinitely, and the same may be said of other alkaloids. This is adopted in the case of apomorphine and ergotin, and might be more frequently used as a solvent. There is no preparation of sulphate of morphine. Its doses and uses are the same as those of hydrochlorate.

LIQUOR MORPHINÆ BIMEICONATIS.

Solution of Bimeconate of Morphine.

Take of Hydrochlorate of Morphine, 9 grains ; Solution of Ammonia, a sufficiency ; Meconic Acid, 6 grains ; Rectified Spirit, $\frac{1}{2}$ fluid oz. ; Distilled Water, a sufficiency.

Dissolve the hydrochlorate of morphine in two or three drachms of distilled water, aiding solution by warmth ; then add solution of ammonia until morphine ceases to be precipitated ; cool ; filter ; wash the precipitate with distilled water until the washings cease to give a precipitate with nitrate of silver ; drain ; mix the precipitate with sufficient water to produce an ounce and a half ; add the rectified spirit and the meconic acid ; dissolve.

Characters and Tests.—A colourless or nearly colourless liquid. Solution of potash produces a white precipitate insoluble in excess. Nitric acid gives an orange-red coloration, and neutral solution of perchloride of iron a blood-red coloration which is not changed by the addition of diluted hydrochloric acid, but is discharged by the strong acid. One fluid ounce of this solution contains about $5\frac{1}{2}$ grains, equal to about $1\frac{1}{4}$ per cent. of bimeconate of morphine ($C_{17}H_{19}NO_3, C_7H_4O_7$). The solution, as regards meconate of morphine, is about the same strength as tincture of opium.

A solution of bimeconate of morphine was proposed by the late Mr. Squire, as early as 1839, as possessing in an eminent degree the sedative power of the morphine. It was prescribed by many with success, and it was thought to represent

the state in which the alkaloid is naturally present in opium. Some have thought it to be the most easily tolerated opiate. The strength of the new liquor is calculated to be equal to laudanum, and the dose is put at the same, 5 to 40 minims.

TINCTURA CHLOROFORMI ET MORPHINÆ.—Here we have a specimen of poly-pharmacy, which deserves to be set out in full—the more especially as the quantities of the active ingredients have been considerably calculated for students and practitioners.

Take of

				Contains in a 10-minim dose
Chloroform	..	..	1 fluid ounce	1 $\frac{1}{4}$ minim
Ether	..	..	2 fluid drachms	$\frac{1}{3}$ minim
Rectified Spirit	..	..	1 fluid ounce	1 $\frac{1}{4}$ minim
Hydrochlorate of Morphine			8 grains	$\frac{1}{48}$ grain
Diluted Hydrocyanic Acid			$\frac{1}{2}$ fluid ounce	$\frac{5}{8}$ minim
Oil of Peppermint	..	..	4 minims	$\frac{1}{80}$ minim
Liquid Extract of Liquorice			1 fluid ounce	1 $\frac{1}{4}$ minim
Treacle	..	..	1 fluid ounce	
Syrup	..	..	a sufficiency	

Dissolve the hydrochlorate of morphine and oil of peppermint in the spirit, and add the chloroform and ether. Mix the liquid extract of liquorice and treacle with three fluid ounces of syrup, add this to the previously formed solution, mix them thoroughly, add the hydrocyanic acid, and increase the volume to eight fluid ounces by further addition of syrup.

Dose.—5 to 10 minims.

By the time the reader reaches the treacle he may be supposed to recollect the amount in 10 minims of this result of the labours of the General Medical Council and its Pharmacopœia Committee of eight. Would this learned body take a step backwards towards the mithridate of ancient pharmacy? No; for the preface asserts that “pains have been taken to bring the whole of the matter up to the existing state of knowledge.” So this must be something modern. Somebody whispers “chlorodyne”? Yes; here is an imitation of a quack nostrum, remarkable for the unblushing effrontery with which it has been pushed, and the sages of the General

Council of Medical Education and Registration have abandoned their dignity in order to fish "the existing state of knowledge" from the polluted streams of unscrupulous advertisements.

APOMORPHINÆ HYDROCHLORAS.

Hydrochlorate of Apomorphine.

Synonym.—Apomorphiæ Hydrochloras.

$C_{17}H_{17}NO_2.HCl$. The hydrochlorate of an alkaloid, obtained by heating morphine or codeine in sealed tubes with hydrochloric acid.

Characters and Tests.—Small, greyish-white, shining, acicular crystals, turning green on exposure to light and air, inodorous, with a very faint acid reaction on moistened litmus paper. Soluble in seven parts of water and fifty parts of alcohol, the solutions being decomposed with production of a green colour when they are boiled. From solutions, bicarbonate of sodium throws down a precipitate which becomes green on standing and then forms a purple solution with ether, violet with chloroform, and bluish-green with alcohol. With dilute solution of perchloride of iron it gives a deep red and with nitric acid a blood-red coloration.

Preparation.—Injectio Apomorphinæ Hypodermica.

INJECTIO APOMORPHINÆ HYPODERMICA.—Hydrochlorate of Apomorphine, 2 grains; Camphor Water, 100 minims; dissolve and filter.

Dose, by subcutaneous injection.—2 to 8 minims.

Apomorphia is chiefly used as a prompt and certain emetic. Acting on the vomiting centre, a dose given subcutaneously causes vomiting in 5 to 15 minutes, and does not leave much nausea or depression afterwards. It even appears to stimulate respiration. It is thus not only the readiest and most certain emetic, but may be given when depressants would be dangerous: when there is local gastric irritation, and when there is difficulty in swallowing. Of course, large or repeated doses might set up prostration and collapse.

Apomorphine is also a valuable expectorant, as shown by experiments on animals by Rossbach (*Berl. Klin. Woch.* 1882), and Petronne (*Lo Sperimentale*, 1883), and by clinical laryngoscopic research by the author (*Respiratory Therapeutics*, 1884),

who has also applied it with a brush and as a spray in preternatural dryness and irritability of the larynx.

Weill has found small doses, 2 to 6 milligrammes, of hydrochlorate, to be powerfully sedative to the nervous system, and recommends it in spasmodic diseases—hiccough, chorea, and epilepsy. Nausea should not be excited. Ludwig and Burgmeister (*Therap. Gaz.*) found that it was anæsthetic and mydriatic when applied to the eye, but it produced pain and irritation, and nausea soon supervened, so that this property is not likely to be of service.

The solution soon changes, acquiring a green colour, and hence should be quite freshly prepared. The B. P. says it "should be made as required for use," but few persons would want in one day 100 minims, or even what was left, after filtering that quantity as directed. Lamellæ would have been a good preparation to insert—they are the most convenient mode of using it.

Dose.— $\frac{1}{25}$ to $\frac{1}{10}$ subcutaneously as an emetic. Of the injection a corresponding quantity. As an expectorant, $\frac{1}{100}$ to $\frac{1}{30}$ gr. may be given by the mouth. The B. P. gives no dose.

CODEINA.—CODEINE.

Synonym.—Codeia.

$C_{18}H_{21}NO_3 \cdot H_2O$.—An alkaloid contained in opium and separated from the ammoniacal liquors from which morphine has been obtained, by evaporating, treating the residue with water, precipitating with caustic potash, and purifying the precipitated alkaloid by recrystallisation from ether.

Characters and Tests.—In colourless or nearly colourless octahedral crystals, soluble in eighty parts of water and of solution of ammonia, readily soluble in spirit and in diluted acids. The aqueous solution has a bitter taste and an alkaline reaction. The alkaloid dissolves in sulphuric acid, forming a colourless solution, which, when gently warmed with molybdate of ammonium or a trace of perchloride of iron, assumes a deep blue colour. Moistened with strong nitric acid, it becomes yellow, but not red. Ignited in air it yields no ash.

Codeine is but a feeble hypnotic, though it appears to allay cough and irritation, and to some extent produce sleep. It is said to stimulate motor centres rather than the brain,

and muscular tremor may follow the first sedative effect. Still, large doses do cause drowsiness, as may often be seen in diabetics who are taking it. It is said to allay irritability of the digestive tract by a special action on the nerves, and perhaps it is in the same way that it affects the respiratory tract. Its chief use is in diabetes, in which Dr. Pavy has shown its effect is to diminish and sometimes arrest the excretion of sugar.

The official *dose* is $\frac{1}{4}$ grain to 2 grains. This is constantly exceeded in diabetes, in which the patient has to be brought under its influence. It is best to begin with $\frac{1}{4}$ or $\frac{1}{2}$ grain three times a day and increase the quantity until the sugar is sensibly reduced or drowsiness is produced. This may require double or treble the official maximum, and some patients have taken much more. It is to be remembered that inferior articles have, no doubt, been made, and sometimes sudden narcotism has been thought to have possibly been due to imperfect separation from other alkaloids. For cough small doses, $\frac{1}{12}$ or $\frac{1}{8}$ to $\frac{1}{6}$, repeated every 2, 4, or 6 hours. It may be given in pill or in solution or syrup.

BELLADONNA.

A new preparation is added—viz., an alcoholic extract prepared from the root. It is four times as strong as the other extract which is made from the leaves, and retains its place in the B. P. There is therefore danger of confusion between the two. It is to be regretted that the name gives no indication of this difference. It would have been just as appropriately named *ext. bellad. radialis*. The new (alcoholic) extract is in future to be employed in making the *emplastrum* and the *unguentum*. (For the liniment, see p. 5.)

Another change as to belladonna is the omission of the useless liquor atropiæ. The solution of the sulphate, *liquor atropinæ sulphatis* remains, but is increased in strength as 109 is to 100 in order to be a 1 per cent. solution. It is difficult to account for the omission of homatropine which ophthalmic surgeons have so long been using.

ERGOT.

There are 2 new preparations of Ergot. Bonjean's ergotine and a fluid for hypodermic use. They have no doubt been

inserted in consequence of the great increase in this mode of using ergot, especially in hæmorrhages. The solution for injection is to be freshly made. Ether is no longer used in Ext. Ergot. Liq.

ERGOTINUM, or Ergotin, is defined as "purified extract." (Liquid extract, 4 fluid oz.; Rectified spirit of each, 4 fluid oz. Evaporate the fluid extract in a water bath to a syrupy consistence, and when cold mix with the spirit; let it stand for $\frac{1}{2}$ -hour, then filter and evaporate to consistence of a soft extract.) *Dose*.—2 to 5 grains.

Injectio Ergotini Hypodermica. (Ergotin, 1 part; Camphor water, 2 fluid parts. Dissolve by stirring together.) To be made as required for use.

CALABAR BEAN

is now re-named *Physostigmatis Semen*. In the last Pharmacopœia it was *Physostigmatis Faba*. It is not easy to see why this change is made. *Faba* is good Latin, and the translation into English is still left "Calabar bean." Is it not a bean? or is it only very like a bean? We are told it has "no marked taste beyond that of an ordinary bean," whatever that may be—surely not *faba*, but the comparison of the size with "a very large horse-bean" is excluded. Students may observe, too, that Calabar bean is now named *physostigmatis semen* (how singular!)—not *semina*, as all the other seeds are called. Perhaps we are to consider this is a hint not to buy more than one a time. There was no *semen* in the B. P. of 1867.

PHYSOSTIGMINA.—PHYSOSTIGMINE.

Synonym.—Eserine.

$C_{15}H_{21}N_3O_2$.—An alkaloid obtained from the alcoholic extract of Calabar bean, by dissolving the extract in water, adding bicarbonate of sodium, shaking the mixture with ether, and evaporating the ethereal liquid.

Characters and Tests.—In colourless or pinkish crystals, slightly soluble in water, but readily soluble in alcohol and in diluted acids. The aqueous solution has an alkaline reaction, when warmed with or when shaken with dilute solution of potash becomes red, and

when evaporated to dryness over a water-bath leaves a bluish residue, acidified solution of which is beautifully dichroic, being blue and red. Physostigmine causes contraction of the pupil of the eye.

This alkaloid, more commonly known as eserine, has been found more convenient than the extract of Calabar bean in ophthalmic practice, and for hypodermic injection has sometimes been used. The extract was in the B. P. for 1867. A solution of the alkaloid, or preferably of a salt, 2 grains in 1 oz., is commonly used to cause contraction of the pupil. It is dropped into the eye in the same way as solution of atropine, the effects of which it neutralises. It also diminishes intraocular tension, and is therefore used in glaucoma, staphyloma, perforating keratitis, &c.; to restrict the entrance of light in photophobia; in paralysis of the iris and ciliary muscle after diphtheria, &c.; to antagonise atropine both in reference to dilatation of the pupil and paralysis of accommodation. Also alternately with atropine to detect, and, if present, break down, adhesions produced by iritis.

Internally, given hypodermically— $\frac{1}{60}$ to $\frac{1}{12}$ of a grain in tetanus, and other diseases depending on irritation of the spinal centres. The extract of Calabar bean is perhaps preferred.

LAMELLÆ PHYSOSTIGMINÆ.—Discs of Physostigmine are now official. Each is to weigh about $\frac{1}{60}$ of a grain, and to contain $\frac{1}{1000}$ grain of the alkaloid.

Use.—To contract the pupil. They have the advantage over solutions that they keep well and are very convenient.

LUPULUS.—HOP.

LUPULINUM.—Lupulin—(syn. lupulinic glands)—is now made official, and consists of the glandular powder from the dried strobiles of the *Humulus Lupulus*, *Linn.*—Under the microscope the translucent, reticulated “globular-top-shaped” glands are seen. It is a bright yellowish brown powder which smells and tastes strongly of the hop and can be used internally. Half a drachm in a pint of warm water makes a soothing vapour. Too often the essential oil has been used for this purpose, but it is an irritant.

Dose.—Official 2—5 gr. This may be exceeded. May be given in pill.

ECBALLII FRUCTUS.

Squirting Cucumber Fruit.

Here is a lesson in spelling. Henceforth the “1” is to be doubled—no doubt to the horror of George Harley, but, correctly enough, if the word is to be derived from *ἑκβάλλω*, I cast out. Further, in the description the words *Ecballium Elaterium* now replace *Ecbalium officinarum*. A reference to Bentley and Trimen takes the place of Stephenson and Churchill. We are further told that the fruit is obtained from plants cultivated in Great Britain.

ELATERIUM, with the still recognised synonym of *Extractum Elaterii* remains in the Pharmacopœia, but is only used for the preparation of the active principle, *elaterin*; the former compound powder—*Pulv. Elaterii Comp.* is expunged, and a new powder, *Pulv. Elaterini Comp.*, is introduced in its place.

ELATERINUM.—ELATERIN.— $C_{20}H_{23}O_5$.

The active principle of elaterium. It may be obtained by exhausting elaterium with chloroform, adding ether to the chloroformic solution, collecting the precipitate, washing the latter with ether, and purifying by recrystallisation from chloroform.

Characters and Tests.—A chemically neutral substance. In small colourless crystals; insoluble in water, sparingly soluble in rectified spirit. It has a bitter taste. Heated with access of air, it first melts and then burns, leaving no residue. With melted carbolic acid it yields a solution which, on the addition of sulphuric acid, acquires a crimson colour rapidly changing to scarlet. It is not precipitated from solution by tannic acid, nor by the salts of mercury or of platinum.

This active principle is, of course, much more potent than the best elaterium, which is not officially expected to contain more than 20 or 25 per cent. Caution will, therefore, be required, as it would be dangerous to confuse the two. No

doubt elaterin will gradually displace the older elaterium, as it is likely to be more certain in its effects.

Dose.—The range of the official dose seems wide, $\frac{1}{40}$ to $\frac{1}{10}$ grain. Those who have used reliable crystals have found that $\frac{1}{12}$ to $\frac{1}{10}$ grain will produce all the energetic, not to say violent, hydragogue action for which elaterium is given. Full doses of extract have set up gastro-enteritis, and in other cases collapse has followed the excessive catharsis produced. It would, therefore, be as well to put the maximum at $\frac{1}{10}$ grain, never to begin with more than $\frac{1}{20}$ grain, and to be very cautious about increasing the dose. Special care is required in the aged and the debilitated, and it should not be prescribed when gastric or intestinal catarrh or irritation is present.

PULVIS ELATERINI COMPOSITUS—Compound Powder of Elaterin—consists of one part of the new elaterin and 39 parts of sugar of milk carefully powdered in a mortar and intimately mixed. It is intended to be a substitute for the compound powder which first appeared in the additions to the B. P., 1874, with which the

Dose—is made to correspond, viz., $\frac{1}{2}$ grain to 5 grains, the result being that it does not correspond with that given for the active ingredient! (See above.)

PODOPHYLLUM.

TINCTURA PODOPHYLLI, made with the *resin* and S. V. R. 160 grains in a pint. Contains 1 grain in 1 drachm.

Uses and Doses.—A tincture has been frequently employed in small quantities, particularly in sluggish liver and constipation. For this purpose 3 to 5 minims every night will be sufficient to establish regular action. Tincture of nuxvomica may be given at the same time if indicated. The official dose (15 minims to 1 fluid drachm) is an occasional cathartic. It should be combined with a carminative or anodyne (belladonna or hyoscyamus).

ALOIN.—ALOIN.— $C_{16}H_{18}O_7$.

Is a crystalline substance extracted from aloes by solvents and purified by recrystallisation. As obtained from the different varieties of aloes, the products differ slightly, but their medicinal properties are similar.

Characters.—Usually in tufts of acicular crystals yellow, inodorous, and having the taste of aloes. Sparingly soluble in cold water, more so in cold rectified spirit, freely soluble in the hot fluids

Insoluble in ether. Not readily altered in acidified or neutral solutions ; rapidly altered in alkaline fluids.

Aloin was introduced many years ago by Messrs. T. and H. Smith, of Edinburgh, as a reliable, active principle which might be substituted for aloë, or its extract. The B. P. adopts the theory of a single aloin, but many authorities consider that the three varieties, barbaloin, nataloin, and socaloin (as derived from Barbadoes, Natal, and Socotrine aloë respectively), form a homologous series with these formulæ

$$\begin{array}{ccc} \text{C}_{37}\text{H}_{20}\text{O}_7, & \text{C}_{16}\text{H}_{18}\text{O}_7, & \text{C}_{15}\text{H}_{16}\text{O}_7. \\ \text{Barbaloin} & \text{Nataloin} & \text{Socaloin} \end{array}$$

According to this the official aloin would be from Cape or Natal aloës.

The three products may be distinguished thus : A drop of nitric acid on a porcelain slab, in contact with either barbaloin or nataloin, gives a vivid crimson colour, which rapidly fades in the case of barbaloin but is permanent with nataloin, unless heat be applied. This test has scarcely any effect on socaloin. To distinguish barbaloin from nataloin, a minute quantity of each may be added to a drop of sulphuric acid, and then the *vapour*, from a rod dipped in nitric acid, allowed to pass over the surface of each. The nataloin assumes a fine blue colour, but the barbaloin (and socaloin also) will remain unchanged.

Use.—Instead of aloës or its extract. It has been used as a subcutaneous injection, and Fronmueller reports (*Lon. Med. Record*, 1879), that it is efficient and not at all irritant in a solution of 1 in 25.

Dose.— $\frac{1}{2}$ grain to 2 grains.

RHAMNUS.

In the B. P., 1867, the recently expressed juice of the ripe berries of the *Rhamnus catharticus* was employed for making syrupus rhamni, and duly entered as rhamni succus, although the plant itself was not. After a long career as a cathartic, in spite of having obtained the honour of a dissertation,* by Dr. J. G. Kolb, nearly a century ago, the buckthorn gradually fell into disuse, though in many parts of England it is still a popular purgative. Its action is rather drastic and hydragogue, and it is apt to set up a good deal of nausea and griping. Sometimes intense thirst, dryness of the fauces, and slight feverishness are produced by a full

* De Cortice Rhamni Carthartici. Erlangæ, 1794.

dose. When a moderate dose does not act a larger one is not of much use. The uncertainty of its action and its occasional violence contributed to its neglect, besides which, other purgatives have helped to displace it.

Both succus and syrupus are now omitted from the B. P. Why, then, the preceding paragraph? perhaps the reader may exclaim. Because, although the indigenous buckthorn is rejected, two other kinds of rhamnus are admitted, and of each of these two preparations are inserted. One (*Rhamnus Frangula*) is chiefly imported from Holland; the other (*Rhamnus Purshian.*) from America, and both are reported to be very superior to the native plant. So the British Cinderella may retire from the presence of her foreign sisters to the obscurity of unofficial and domestic medicine, and students must look up her successful rivals.

RHAMNI FRANGULÆ CORTEX.

Frangula Bark, Cortex Frangulæ, Frangula Alnus, and Alnus Nigra, as it has sometimes been called, is the dried bark of *Rhamnus Frangula*, *Linn.*; *Bentl. and Trim. Med. Pl.* vol. i. plate 65. It should be collected from the young trunk and moderate-sized branches, and kept at least one year before being used.

Characters.—In small quills, the bark itself being about one twenty-fifth of an inch or somewhat more in thickness, and covered with a greyish-brown or blackish-brown corky layer marked with transverse whitish lenticels; inner surface smooth, brownish-yellow; fracture short and purplish externally, but somewhat fibrous and yellowish within. No marked odour; taste pleasant, sweetish, and slightly bitter.

Extractum Rhamni Frangulæ is made of *Rhamnus Frangula* Bark, in No. 40 powder, 1 lb.; Proof Spirit and Water, of each a sufficiency. Mix the rhamnus with two pints of the spirit, and macerate in a closed vessel for forty-eight hours; then transfer to a percolator, and when the fluid ceases to pass, continue the percolation with water until three pints of liquor have been collected, or the rhamnus is exhausted. Evaporate the percolated liquor by a water-bath until the extract has acquired a suitable consistence.

Dose.—15 to 60 grains—much more than of *Cascara*.

Extractum Rhamni Frangulæ Liquidum.—*Rhamnus Frangula* Bark, in coarse powder, 1 lb.; Rectified Spirit, 4 fluid ozs.; Distilled Water, a sufficiency. Boil the bark in three

or four successive quantities of the water, until exhausted. Evaporate the liquors by the heat of a water-bath to twelve fluid ounces; when cold add the spirit, allow the mixture to remain for some hours, then filter, and make up to the volume of sixteen fluid ounces with distilled water.

It will be observed that spirit is used to extract the bark in one preparation, but not in the other. The two, therefore, may not exactly correspond to each other, but the differences have not been distinctly pointed out.

Dose.—1 to 4 fluid drachms.

The *Rhamnus Frangula* was reintroduced by Mr. H. C. Baildon in 1871, as a more certain and yet milder purgative than common buckthorn. It had long been a popular or domestic remedy. An infusion or decoction was frequently used in dropsy and other diseases when a hydragogue was desired. The extract appears to be a better preparation. This mild aperient may be disguised in a lozenge, as was done by Mr. Baildon. Like other buckthorns, it should be combined with a corrective. The leaves, chopped up, heated over a fire and applied to the breasts, have been popularly credited with the property of arresting the secretion of milk.

RHAMNI PURSHIANI CORTEX.—“SACRED BARK.”

Synonym.—*Cascara Sagrada*.

The dried bark of *Rhamnus Purshianus*, *D.C.*; *Hook. Flora Boreali-americana*, plate 43.

Characters.—In quills or incurved pieces of varying lengths and sizes, the bark itself being from about one twenty-fifth to one-eighth of an inch thick, smooth or nearly so externally, covered with a greyish-white layer, which is usually easily removed, and frequently marked with spots or patches of adherent lichens. Beneath the surface it is violet-brown, reddish-brown, or brownish; and internally reddish-brown or yellowish-brown, and nearly smooth, although somewhat striated longitudinally. Fracture short, except internally, where it is slightly fibrous, more especially in the larger pieces. No marked odour; taste bitter. It is frequently imported in flattened packets, consisting of small pieces of the bark compressed into a more or less compact mass.

Extractum Cascaræ Sagradæ.—This is made precisely in the same manner as *Ext. Rhamni Frang.*, substituting the one *Rhamnus* for the other.

Official dose.—2 to 8 grains.

Ext. Cascaræ Sagradæ Liquidum.—This also is made precisely as the liquid Extract of Rhamnus Frangula.

Official dose.— $\frac{1}{2}$ to 2 fluid drachms.

NOTE.—The dose of either extract of Rhamnus Frangula is more than seven times larger than the corresponding *Ext. Cascaræ Sagradæ*.

Here is a marvellous thing! The General Council of Medical Education, &c., translates this Rhamni Purshiani cortex, as “sacred bark.” Such a popular name may be very well as a synonym, but is certainly no rendering of the Latin words. It would pass indeed as a translation of the synonym given, though as there are many “holy wells,” so we may meet with more than one sacred bark, to say nothing of the difference between holy and sacred.

But surely the learned Pharmacopœia Committee should know that “*cascaræ sagrada*” is not even dog Latin for sacred bark, and yet they proceed innocently to decline it after the first declension feminine, and give us both words in the genitive. So we must write *ext. cascaræ sagradæ*, &c., though the words are not to be found in Ainsworth or Riddle, but will turn up in the first Spanish dictionary which may be within reach of our Educational Council. It was scarcely to be expected that a committee on which Oxford is so ably represented should show weak Latinity, but even Homer is said to sometimes nod, and the *ext. cascaræ sagradæ* of the new B. P. may serve to raise a smile and remind us of the *oleum theobromæ* of 1867.

A few years ago a somewhat amusing controversy took place respecting an alleged new remedy indigenous to California, which had been introduced under the name of *Cascaræ sagrada*. This turned out to be the *Rhamnus Purshianus*, which flourishes on the Pacific coast of North America, and possesses properties allied to those of *Rhamnus catharticus*, and *Rhamnus frangula*. *Cascaræ sagrada* was the common name among the Spanish Americans, but the plant was also locally spoken of as *shittim*; hence some one speculated that it was “the same as yielded ‘shittim wood’ for Solomon’s Temple”—thus confusing Temple and Tabernacle, and all unaware that the Hebrew word *shittah* means *acacia*.

The *Rhamnus Purshianus** received its name after F. Pursh,

* Most botanists write *R. Purshiana*. Many students would like to know why, if they are to write *R. Frangula*, they must put *R. Purshianus*.

who first fixed its botanical position. It is now widely used in the United States, and is becoming known in this country. *Rhamnus Pursh.* seems to be less uncertain in its action than the other varieties, and not so likely to disagree, although this may partly depend on the preparation. It is well-known that considerable changes take place in the other rhamni during storage, so that it is better to keep them a year or two before using, and as the chemical qualities are rather similar, probably the same rule applies. Moreover, as already remarked, the buckthorns should not be given without a corrective. These are the two cardinal points to observe in the use of either rhamnus. Most of the cascara used in this country has been prepared by Parke, Davis, & Co. The most successful of the preparations is their "Cascara Cordial," in which these rules are well applied. It is a compound with aromatic correctives, and no doubt the bark has been carefully selected and properly stored—the firm in question being in a position to do this on a large scale.

Professor A. B. Prescott (*New Preparations*.—Feb. 1879) separated three distinct resinous bodies—a bitter brown resin, a red resin, and a light yellow resin—from the bark, besides a crystallisable body and a volatile oil. Their relations to similar bodies found in the other rhamni have not yet been determined, but they appear to be very similar to the rhamnin, rhamnegin, xanthorhamnin, frangulin, and other substances, which have been found in *R. catharticus* and *R. frangula*. With the two plants in the B. P. chemists may perhaps renew their investigations.

Cascara sagrada has been strongly recommended in habitual constipation, and for this purpose is usually given in small doses, once, twice, or thrice a day. In full doses it is an efficient aperient. It takes ten or twelve hours to act, and, therefore, is most conveniently given at bed-time, when used as a simple purge. It will then act the next morning. Usually, a drachm of fluid extract will act as freely as an ordinary pill or a black draught. The only objection is the bitter taste. This is effectually disguised in the "cordial" named, which is, however, much less active, the dose required being 4 to 6 drachms or more. This can be taken by the most fastidious, and rarely fails to act.

In constipation, quite small doses—sometimes called tonic doses—are recommended, 10 or 15 or 20 minims twice or thrice a day, a little before meals. The remedy is to be

continued until the bowels act with regularity, the dose being gradually diminished rather than increased.

No doubt cascara increases peristalsis. Perhaps it also increases intestinal secretion. It may claim to be a cholagogue in some sense, for as I have shown (*Med. Press*, 1883) it certainly seems to add biliary colouring matter to the evacuations. It irritates so slightly that it may often be given in hæmorrhoids, but I cannot help thinking that much must depend on the preparation, and that a badly made extract from fresh bark would be as uncertain, and as liable to gripe and irritate, as some specimens of the old-fashioned buckthorn. If the *Rhamnus Purshianus* prove destitute of the acrid resin which probably causes these symptoms, it will be a great advantage.

SCAMMONIUM.

Only two preparations are in future to be made with scammony, viz.:—*Mistura Scammonii* (3 grains in 1 fluid ounce); *Resina Scammoniæ*—but from the latter all the other preparations are to be made, viz.:—*Confectio Scammonii*, 1 part in 3, nearly; *Extractum Colocynthis Compositum*, 1 part in 7, nearly; *Pilula Colocynthis Composita*, 1 part in 3, nearly; *Pilula Scammonii Composita*, 1 part in 3, nearly; *Pulvis Scammonii Compositus*, 1 part in 2.

TARAXACUM.

We had previously 2 preparations of fresh and 1 of dried root. To make them equal an additional dry is introduced. By-the-by, in the list of preparations (*p.* 405) the new one is, by a misprint, said to be from the fresh root, whereas it is from the dry, powdered, thus:—

EXTRACTUM TARAXACI LIQUIDUM.—Liquid Extract of Dandelion.—Take of Dry Dandelion Root, in No. 20 powder, 40 ounces; Proof Spirit, 4 pints; Distilled Water, a sufficiency. Mix the dandelion with the spirit, and macerate in a closed vessel for 48 hours, then press out 20 fluid ounces of liquid, and set this aside. Mix the pressed residue with the water, and again macerate for 48 hours, press out and strain the liquid, evaporate this by a water bath to about 18 fluid ounces. Mix the two liquids, and make up the volume to 40 fluid ounces by the addition of distilled water.

Dose.— $\frac{1}{4}$ to 2 fluid drachms.

NUX VOMICA.

The extract is now ordered to be standardised, so as to contain 15 per cent. of total alkaloid. It may be observed that the tendency on keeping will be to increase in strength by drying, and it would be advisable to make a new assay of any old or dry sample. A standardised preparation should really be reduced to as stable a condition as practicable, which can scarcely be said to be the case in moist extracts.

TINCT. NUCIS VOM. is now to be made by dissolving 133 grains of standardised extract (p. 8) in a pint of liquid, made by adding to 4 fl. oz. of water sufficient spirit to fill exactly 20 fl. oz. This tincture will, therefore, contain 1 grain of the alkaloids of Nux Vomica in 1 fl. oz.

Official dose.—10 to 20 minims.

IPECACUANHA.

A new formula is furnished for the wine, founded doubtless on the ascertained solubility of emetine in acetic acid. It is much more troublesome to make, and, so far, discourages dispensers from making their own. An acetum has been in use for a long time, is a better preparation, and might as well have been made official. The new Vinum differs in appearance from the old.

VINUM IPECACUANHÆ is now made as follows :—

Prep.—Ipecacuanha, coarsely powdered, 1 oz. ; Acetic Acid, 1 fluid oz. ; Distilled Water, a sufficiency ; Sherry, 1 pint. Macerate the ipecacuanha in the acetic acid for twenty-four hours. Transfer to a percolator, and pass sufficient distilled water through to produce one pint of liquor. Evaporate the product to dryness over a water-bath. Powder the residue and macerate it in the sherry for forty-eight hours, with occasional agitation, and filter. It is rather difficult to powder the extract, and seems quite unnecessary.

Official Dose.—5 to 40 minims as an expectorant ; 3 to 6 fluid drachms as an emetic.

KINO.

TINCT. KINO, now made by macerating 2 oz. of coarsely-powdered kino in 3 fl. oz. of Glycerine, 5 of water, and 12 of spirit for 7 days, and, after filtering, adding enough S. V. R. to make 1 pint.

TRAGACANTH.

This preparation, long in use as an excipient for pills, is now made official, viz. :—

GLYCERINUM TRAGACANTHÆ—Take of powdered tragacanth 3 parts, glycerine 12 fluid parts, distilled water 2 fluid parts. Mix the Tragacanth with the glycerine in a mortar, add the water, and rub until a translucent jelly is produced.

CINNAMOMI CORTEX.

Instead of the bark a new spirit is used in making the acid. sulph. aromat., which is otherwise altered, and now enters into Infusum Cinchonæ Acidum (1 drachm in $\frac{1}{2}$ pint), which made with red bark, takes the place of the former simple infusion of yellow bark.

SPIRITUS CINNAMOMI, made of oil, 1; Sp. Rect. 49, as in other cases.

Dose.— $\frac{1}{2}$ to 1 fluid drachm.

TINCT. CINNAM. is now made with rectified instead of proof spirit, but by a curious error the product, after pressing, is ordered to be made up with proof spirit. *Dose*, $\frac{1}{2}$ to 2 fl. drachms. The same error has crept into the form for Tinct. Sumbul.

OL. TEREBINTHINÆ.

LINIM. TEREBINTH.—Water is now to be added—2 fl. oz. to the quantities of the other ingredients formerly ordered. This gives a better product.

LIN. TEREB. ACETIC.—Glacial Acetic Acid is now to be employed—1 part to 4 pts. each of Ol. Tereb. and Lin. Camph. This also makes a better liniment.

SAPO.

LIN. SAPONIS is altered, and probably improved. It is now made with Hard Soap in fine shavings, 2 oz.; Camphor, 1 oz.; Oil of Rosemary, 3 fl. drachms; Rectified Spirit, 16 fl. oz.; Distilled Water, 4 fl. oz. Directions as before.

CANTHARIS.

COLLODIUM VESICANS.—The liquor Epispasticus with which this collodion is made, is now prepared with acetic ether only, and improved exhaustion of the cantharides is said to require only 5 oz., in place of the 8 oz. of the B. P. of 1867, to give a pint of liquid by percolation.

CHANGES OF NAME.

THE FOLLOWING IS A LIST OF THE CHANGES OF NAMES WHICH
HAVE BEEN MADE BY THE NEW B. P.

OLD NAMES.	NEW NAMES.
<i>Aconitia</i>	Aconitina
<i>Albumen Ovi</i>	Ovi Albumen
<i>Ammonia Benzoas</i>	Ammonii Benzoas
<i>Ammonia Carbonas</i>	Ammonii Carbonas
<i>Ammonia Nitras</i>	Ammonii Nitras
<i>Ammonia Phosphas</i>	Ammonii Phosphas
<i>Arnica Radix</i>	Arnica Rhizoma
<i>Assafetida</i>	Asafoetida
<i>Atropia</i>	Atropina
<i>Atropia Sulphas</i>	Atropina Sulphas
<i>Beberia Sulphas</i>	Beberina Sulphas
<i>Calci Carbonas Præcipitata</i> ..	Calcii Carbonas Præcipitata
<i>Calci Hydras</i>	Calcii Hydras
<i>Calci Hypophosphis</i>	Calcii Hypophosphis
<i>Calci Phosphas</i>	Calcii Phosphas
<i>Calx Chlorata</i>	Calx Chlorinata
<i>Canella Albæ Cortex</i>	Canella Cortex
<i>Cardamomum</i>	Cardamomi Semina
<i>Catechu Pallidum</i>	Catechu
<i>Cinchona Flavæ Cortex</i>	Cinchona Cortex
<i>Cinchona Pallidæ Cortex</i>	Cinchona Cortex
<i>Decoctum Cinchona Flavæ</i>	Decoctum Cinchona [Rubra]
<i>Ecbalii Fructus</i>	Ecbalii Fructus
<i>Emplastrum Cerati Saponis</i> ...	Emplastrum Saponis Fuscum

OLD NAMES.	NEW NAMES.
<i>Enema Assafetidæ</i>	Enema Asafœtidæ
<i>Enema Magnesicæ Sulphatis</i>	Enema Magnesii Sulphatis
<i>Extractum Cinchonæ Flavæ</i> } <i>Liquidum</i>	Extractum Cinchonæ [Rubræ] Liquidum
<i>Ferri et Ammonicæ Citras</i>	Ferri et Ammonii Citras
<i>Ferri et Quinicæ Citras</i>	Ferri et Quininæ Citras
<i>Hydrargyri Sulphas</i>	Hydrargyri Persulphas
<i>Infusum Cinchonæ Flavæ</i> ..	Infusum Cinchonæ [Rubræ] Acidum
<i>Liquor Ammonicæ Acetatis</i>	Liquor Ammonii Acetatis
<i>Liquor Ammonicæ Citratis</i>	Liquor Ammonii Citratis
<i>Liquor Atropicæ Sulphatis</i>	Liquor Atropinæ Sulphatis
<i>Liquor Bismuthi et Ammonicæ</i> } <i>Citratis</i>	Liquor Bismuthi et Ammonii Citratis
<i>Liquor Calcis Chloratæ</i>	Liquor Calcis Chlorinatæ
<i>Liquor Magnesicæ Carbonatis</i>	Liquor Magnesii Carbonatis
<i>Liquor Magnesicæ Citratis</i>	Liquor Magnesii Citratis
<i>Liquor Morphiæ Acetatis</i>	Liquor Morphinæ Acetatis
<i>Liquor Morphiæ Hydrochloratis</i>	Liquor Morphinæ Hydrochloratis
<i>Liquor Potassæ Permanganatis</i>	Liquor Potassii Permanganatis
<i>Liquor Sodæ Arseniatis</i>	Liquor Sodii Arseniatis
<i>Liquor Sodæ Chloratæ</i>	Liquor Sodæ Chlorinatæ
<i>Liquor Strychniæ</i>	Liquor Strychninæ Hydrochloratis
<i>Lithiæ Carbonas</i>	Lithii Carbonas
<i>Lithiæ Citras</i>	Lithii Citras
<i>Magnesia</i>	Magnesia Ponderosa
<i>Magnesicæ Carbonas</i>	Magnesii Carbonas Ponderosa
<i>Magnesicæ Carbonas Levis</i>	Magnesii Carbonas Levis
<i>Magnesicæ Sulphas</i>	Magnesii Sulphas
<i>Morphiæ Acetas</i>	Morphinæ Acetas
<i>Morphiæ Hydrochloras</i>	Morphinæ Hydrochloras
<i>Oleum Theobromæ</i>	Oleum Theobromatis
<i>Physostigmatis Faba</i>	Physostigmatis Semen
<i>Pilula Aloes et Assafetidæ</i>	Pilula Aloes et Asafœtidæ
<i>Pilula Assafetidæ Composita</i>	Pilula Asafœtidæ Composita
<i>Podophylli Radix</i>	Podophylli Rhizoma
<i>Potassæ Acetas</i>	Potassii Acetas
<i>Potassæ Bicarbonas</i>	Potassii Bicarbonas
<i>Potassæ Bichromas</i>	Potassii Bichromas
<i>Potassæ Carbonas</i>	Potassii Carbonas
<i>Potassæ Chloras</i>	Potassii Chloras
<i>Potassæ Citras</i>	Potassii Citras

OLD NAMES.			NEW NAMES.
<i>Potassæ Nitras</i>			Potassii Nitras
<i>Potassæ Permanganas</i>			Potassii Permanganas
<i>Potassæ Prussias Flava</i>			Potassii Ferrocyanidum
<i>Potassæ Sulphas</i>			Potassii Sulphas
<i>Potassæ Tartras</i>			Potassii Tartras
<i>Potassæ Tartras Acida</i>			Potassii Tartras Acida
<i>Quiniæ Sulphas</i>			Quininæ Sulphas
<i>Serpentariæ Radix</i>			Serpentariæ Rhizoma
<i>Sodæ Arsenias</i>			Sodii Arsenias
<i>Sodæ Bicarbonas</i>			Sodii Bicarbonas
<i>Sodæ Carbonas</i>			Sodii Carbonas
<i>Sodæ Carbonas Exsiccata</i>			Sodii Carbonas Exsiccata
<i>Sodæ Citro-tartras Effervescens</i>			Sodii Citro-tartras Effervescens
<i>Sodæ Hypophosphis</i>			Sodii Hypophosphis
<i>Sodæ Nitras</i>			Sodii Nitras
<i>Sodæ Phosphas</i>			Sodii Phosphas
<i>Sodæ Sulphas</i>			Sodii Sulphas
<i>Sodæ Valerianas</i>			Sodii Valerianas
<i>Strychnia</i>			Strychnina
<i>Suppositoria Morphine</i>			Suppositoria Morphine
<i>Suppositoria Morphine cum Sapone</i>			Suppositoria Morphine cum Sapone
<i>Tinctura Assafoetide</i>			Tinctura Asafoetide
<i>Tinctura Quiniæ</i>			Tinctura Quininæ
<i>Tinctura Quiniæ Ammoniata</i>			Tinctura Quininæ Ammoniata
<i>Trochisci Morphine</i>			Trochisci Morphine
<i>Trochisci Morphine et Ipecacuanhæ</i>			Trochisci Morphine et Ipecacuanhæ
<i>Trochisci Potassæ Chloratis</i>			Trochisci Potassii Chloratis
<i>Trochisci Sodæ Bicarbonatis</i>			Trochisci Sodii Bicarbonatis
<i>Unguentum Aconitie</i>			Unguentum Aconitinæ
<i>Unguentum Atropie</i>			Unguentum Atropinæ
<i>Unguentum Veratri</i>			Unguentum Veratrinæ
<i>Valeriane Radix</i>			Valeriane Rhizoma
<i>Vapor Conie</i>			Vapor Coninæ
<i>Veratri Viridis Radix</i>			Veratri Viridis Rhizoma
<i>Veratria</i>			Veratrina
<i>Vinum Quiniæ</i>			Vinum Quininæ

SUBSTITUTIONS.

* * The following is a list of articles in which a change of name signifies a change in the substance to be employed. To distinguish them the newly substituted article is printed in *ITALICS*.

<i>Antimonium Nigrum Purificatum</i>	Antimonium Nigrum
<i>Cinchonæ Rubræ Cortex (in preparations)</i>	Cinchonæ Flavæ Cortex, Cinchonæ Pallidæ Cortex
<i>Pulvis Elaterini Compositus</i> ...	Pulvis Elaterii Compositus
<i>Tinctura Cinchonæ [Rubræ]</i> ...	Tinctura Cinchonæ Flavæ
<i>Unguentum Glycerini Plumbi Subacetatis</i> ... }	Unguentum Plumbi Subacetatis Compositum

ADDENDA.

ADDITIONS TO THE B. P.

THE FOLLOWING IS THE OFFICIAL LIST OF ARTICLES AND PREPARATIONS INCLUDED IN THE BRITISH PHARMACOPŒIA OF 1885, WHICH WERE NOT IN THAT OF 1867 NOR IN THE "ADDITIONS" PUBLISHED IN 1874.

Acidum Boricum	Calcii Sulphas
Acidum Carbolicum Liquefactum	Calx Sulphurata
Acidum Chromicum	Chrysarobinum
Acidum Hydrobromicum Dilutum	Cimicifugæ Rhizoma
Acidum Lacticum	Cinchonidinæ Sulphas
Acidum Lacticum Dilutum	Cinchoninæ Sulphas
Acidum Meconicum	Coca
Acidum Oleicum	Cocainæ Hydrochloras
Acidum Phosphoricum Concentratum	Codeina
Acidum Salicylicum	Collodium Vesicans
Alcohol Ethylicum	Cupri Nitras
Aloin	Elaterinum
Apomorphinæ Hydrochloras	Ergotinum
Argenti et Potassii Nitras	Extractum Belladonnæ Alcoholicum
Arsenii Iodidum	Extractum Cascaræ Sagradæ
Bismuthi Citras	Extractum Cascaræ Sagradæ Liquidum
Bismuthi et Ammonii Citras	Extractum Cimicifugæ Liquidum
Butyl-Chloral Hydras	Extractum Cocæ Liquidum
Caffeina	Extractum Gelsemii Alcoholicum
Caffeinæ Citras	Extractum Jaborandi
Calamina Præparata	

Extractum Rhamni Frangulæ	Paraffinum Durum
Extractum Rhamni Frangulæ Liquidum	Paraffinum Molle
Extractum Taraxaci Liquidum	Physostigmina
Gelsemium	Philocarpinæ Nitras
Glycerinum Aluminis	Potassii Cyanidum
Glycerinum Plumbi Subac-	Quininae Hydrochloras
tatis	Rhamni Frangulæ Cortex
Glycerinum Tragacanthæ	Rhamni Purshiani Cortex
Infusum Jaborandi	Salicinum
Injectio Apomorphinæ Hypo-	Sodii Bromidum
dermica	Sodii Iodidum
Injectio Ergotini Hypoder-	Sodii Salicylas
mica	Sodii Sulphis
Iodoformum	Sodii Sulphocarbolas
Jaborandi	Sodium
Lamellæ Atropinæ	Spiritus Ætheris Compositus
Lamellæ Cocainæ	Spiritus Cinnamomi
Lamellæ Physostigminæ	Staphisagriæ Semina
Liquor Acidi Chromici	Suppositoria Iodoformi
Liquor Ammonii Acetatis	Tabellæ Nitroglycerini
Fortior	Thymol
Liquor Ammonii Citratis	Tinctura Chloroformi et
Fortior	Morphinæ
Liquor Arsenii et Hydrargyri	Tinctura Cimicifugæ
Iodidi	Tinctura Gelsemii
Liquor Calcii Chloridi	Tinctura Jaborandi
Liquor Ferri Acetatis	Tinctura Podophylli
Liquor Ferri Acetatis Fortior	Trochisci Santonini
Liquor Ferri Dialysatus	Unguentum Acidi Borici
Liquor Morphinæ Bimecon-	Unguentum Acidi Carbolic
atis	Unguentum Acidi Salicylici
Liquor Sodii Ethylatis	Unguentum Calaminæ
Lupulinum	Unguentum Chrysarobini
Menthol	Unguentum Eucalypti
Morphinæ Sulphas	Unguentum Hydrargyri Ni-
Oleatum Hydrargyri	tratis Dilutum
Oleatum Zinci	Unguentum Iodoformi
Oleo-Resina Cubebæ	Unguentum Staphisagriæ
Oleum Eucalypti	Unguentum Zinci Oleati
Oleum Pini Sylvestris	Vapor Olei Pini Sylvestris
Oleum Santali	Zinci Sulphocarbolas

THE FOLLOWING IS THE OFFICIAL LIST OF ARTICLES AND PREPARATIONS IN THE B. P. 1867, BUT OMITTED IN THE NEW B. P. 1885.

<i>Areca</i>	<i>Infusum Dulcamaræ</i>
<i>Cadmii Iodidum</i>	<i>Liquor Atropiæ</i>
<i>Castoreum</i>	<i>Mistura Gentianæ</i>
<i>Decoctum Ulmi</i>	<i>Pilula Quiniæ</i>
<i>Digitalinum</i>	<i>Rhamni Succus</i>
<i>Dulcamara</i>	<i>Sodæ Acetas*</i>
<i>Enema Tabaci</i>	<i>Stramonii Folia</i>
<i>Ferri Iodidum</i>	<i>Syrupus Rhamni</i>
<i>Ferri Oxidum Magneticum</i>	<i>Tinctura Castorei</i>
<i>Ferri Peroxidum Humidum</i>	<i>Ulmi Cortex</i>
<i>Hydrargyri Iodidum Viride</i>	<i>Unguentum Cadmii Iodidi</i>

PREPARATIONS THE COMPOSITION OF WHICH HAS BEEN MATERIALLY ALTERED IN THE NEW B. P.

<i>Acidum Sulphurosum</i>	<i>Tinctura Quiniæ</i>
<i>Alumen</i>	<i>Unguentum Hydrargyri Am-</i> <i>moniati</i>
<i>Antimonium Sulphuratum</i>	The fatty basis of the four suppositories of B. P. 1867 is now oil of theobroma only
<i>Extractum Cinchonæ Liqui-</i> <i>dum</i>	In some of the ointments paraffins have been substi- tuted for lard
<i>Infusum Cinchonæ Acidum</i>	Scammony Resin has been substituted for Scammony in most preparations of Scammony
<i>Injectio Morphinæ Hypo-</i> <i>dermica</i>	
<i>Liquor Epispasticus</i>	
<i>Liquor Iodi</i>	
<i>Oleum Phosphoratum</i>	
<i>Pilula Phosphori</i>	
<i>Pulvis Glycyrrhizæ Com-</i> <i>positus</i>	

* Acetate of Soda is placed in this list erroneously, as it is still used in preparing acetic ether.

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Hyalpine = Methylacetanilide.

Useful as a ^{mild} analgesic for certain pains especially of a neuralgic nature but of no use where general narcotism is required.

Dose $\frac{1}{2}$ to grs 10 (better to give 1 gr every 20 min until 3 grs have been given if necessary)

Strophanthus Hispidus Cardiac Tonic

Advantages over Digitalis Antipyretic

1. More powerful on heart & less on vessels.
2. Non-cumulative.
3. Not apt to produce sickness or other gastric disturbance.
4. Does not lose its effects on the system by pt becoming habituated to it.

Preparations & their doses

1. Linch - 2 m to 10 m.
2. Strophanthin $\frac{1}{20}$ to $\frac{1}{60}$ gr hypodermically

- N. B. - 1. Useful in anaemia assisting the action of iron -
2. Its action is increased by comb with 3 gr doses of ether.
 3. Encourages the action of the kidneys -



